

NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

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► COMMON CARRIER CONTROL

AT&T quells EPSCS user insurrection

BY BOB WALLACE
Senior Editor

By rekindling hopes of EPSCS network improvements, AT&T has quashed a rebellion by EPSCS users who were preparing a request for proposal (RFP) for an all-digital private network alternative to the AT&T offering.

Network World has learned that several large users, uncertain about the future of AT&T's Enhanced Private-Switched Communications Service (EPSCS), issued a preliminary RFP for a shared network that would offer many current EPSCS features and would bypass the Bell operating companies.

One EPSCS user, Forrest Smoker, telecommunications manager for New York-based North American Philips Corp., acknowledged that a preliminary RFP was issued but that AT&T's renewed discussion of See **EPSCS** page 48

EPSCS vs. SDN

	EPSCS	SDN
Service type:	Private line-based	Switched network-based
Traffic handled:	Primarily voice	Primarily voice
Data transmission speed supported:	4.8K	9.6K
Number of network access nodes:	17	More than 600
Number of current users:	24	N/A
Staple network switch:	1ESS	4ESS
Numbering plan:	7-digit	7-digit
Call detail recording:	Yes	Yes
Call authorizations:	Yes	Yes

EPSCS = AT&T's Enhanced Private-Switched Communications Service
SDN = AT&T's Software-Defined Network
SOURCE: AT&T

► REGULATORY RELIEF

BOCs shake CPE subsidiary rules

FCC bends to demands, serves up changes for Baby Bells.

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — The Bell operating companies got an early Christmas present last week when the Federal Communications Commission unshackled them from the Second Computer Inquiry rules that required BOCs to establish separate subsidiaries to market customer premises equipment.

The ruling mirrors a similar Third Computer Inquiry rule that removed the separate subsidiary requirement for enhanced services. The agency will replace its separate subsidiary strictures with as yet undeveloped accounting guidelines designed to prevent cross-subsidization of equipment sales ventures. The accounting rules are expected to be announced and adopted by the FCC next month. The FCC's ruling was applauded by the BOCs and met with little opposition from independent equipment vendors.

The BOCs will still be precluded from bundling customer premises equipment with telecommunica- See **CPE** page 48

The Federal Communications Commission denies Nynex's bid to restructure its access tariffs. See "FCC nixes Nynex plan," Page 2.

NETWORK LINE

News

General Motors has a squeaky wheel — its data processing subsidiary, Electronic Data Systems. GM hoped to grease that squeak by selling EDS to AT&T, but the firms failed to reach an accord. Page 2.

Intelsat suspends its top two officers over allegations that, without consulting the board of governors as required, they paid a broker \$1 million to re-finance a loan for the organization's headquarters. Page 2.

Control Data Corp. hangs its shingle on the IBM clubhouse with a front-end processor

that takes on many host SNA routing functions. Page 4.

Approaches to ISDN trials vary from US West's aggressive field testing to Southwestern Bell's conservative laboratory experiments. Page 4.

Features

Vendor challenges to purchase decisions in the public sector can sink the careers of communications managers. A strong defense requires careful preparation. Page 32.

Tough questioning by communications managers can expose consultants' biases and conflicts of interest. Part 2 of this Investigative report lays out smart user strategies. Page 41.

FEATURE FOCUS

Market research firms pitch new user-oriented services

BY PAM POWERS
Senior Editor

You're wallowing in self-pity. You have an enormous beast of a network to contend with, but your company's methods for management and expansion are troglodytic at best. You have incompatibility problems that would try the pa-

tience of a saint. You have too many choices to make amid a vast sea of product marketing hype.

And upper management, blissfully unaware of your plight, is only wondering how much money you can save the company and how soon.

Outside the company walls, people See **Research** page 35

► STANDARDS STANDOFF

TCP/IP faces user scrutiny, competition from OSI model

BY JOHN DIX
Senior Editor

Users looking to the U.S. Department of Defense's TCP/IP protocol as an interim solution while waiting for international standards may be selling themselves short. Some analysts say products that support international standards are already available and implementing them today instead

of TCP/IP will save the effort of making the migration later.

The Defense Department's Transmission Control Protocol/Internet Protocol (TCP/IP) became popular outside the military environment during the past year, when users found they could employ the protocol as a common denominator for heterogeneous computer networks.

See **TCP/IP** page 48

► ANALYSIS

Internal strife spurred GM, AT&T talks on EDS

Giants can't agree on sale of service firm.

BY BOB WALLACE
Senior Editor

DETROIT — Friction between General Motors Corp. employees and those of the company's Electronic Data Systems Corp. (EDS) subsidiary reportedly drove the nation's largest automaker to attempt to sell EDS to AT&T earlier this month.

Recently published reports claim that GM, the world's largest company, conducted two months of negotiations aimed at selling all or part of EDS to AT&T. The talks reportedly collapsed earlier this month.

GM, which valued EDS at between \$5 billion and \$6 billion, could not agree on a price with AT&T, which argued that EDS was worth considerably less.

AT&T already has a 7-year agreement with EDS, signed in January 1985, under which the two jointly develop and market specialized computer networks to AT&T's largest customers.

News of the GM-AT&T talks met with positive reactions from financial analysts and communications industry watchers who say the GM-EDS marriage has been a rocky one since GM's \$2.5 billion acquisition

of the computer services firm in 1984. The analysts concurred that AT&T would make a better partner for EDS than GM.

Questions concerning the future of the automaker's gargantuan internal communications network and of its once-robust factory automation program have arisen as the result of the failed sales bid.

AT&T's interest in purchasing EDS was driven by a desire to package its computer products with its array of long-distance services. AT&T reportedly considered buying EDS in 1983, before the data processing heavyweight was acquired by GM.

Talk of friction between EDS and GM officials, especially at the highest levels, is news to no one. Dan McFarland, a principal engineer with Washington, D.C.-based R.W. Beck and Associates, an engineering and consulting firm, served as a telecommunications manager for

See GM page 45

► ACCESS TARIFFS

FCC nixes Nynex rate proposal

Opponents of plan laud decision.

BY MICHAEL FAHEY
AND KARYL SCOTT
Network World

WASHINGTON, D.C. — Opponents of Nynex Corp.'s proposed access restructure tariff last week applauded the Federal Communication Commission's decision to reject the proposal, which would have hiked private-line costs and required users to pay separately for local access to long-distance carriers.

In rejecting Nynex's proposal, the FCC said the plan would have served Nynex's — not the public's — interest. Nynex's arguments were "insufficient to resolve the many complex issues associated with the plan to recover costs directly from end users," said FCC Common Carrier Bureau Chief Albert Halprin.

James Blaszak, counsel for the Ad Hoc Telecommunications Users Committee, hailed the FCC for ruling against the Nynex proposal and for invoking the public interest as a standard for approving future efforts to restructure access tariffs. Blaszak's group represents some of the largest users in the nation. Interexchange carriers, consumers and other users groups also lauded the FCC's ruling.

Said Brian Moir, attorney for the International Communications Association, "This is what we have been hoping for. It is what we have been working toward since Nynex filed its proposal."

Nynex asked the FCC in June for a waiver to the commission's access charge rules, in order to restructure its tariffs for switched and special access service. Nynex wanted to recover non-traffic-sensitive and traffic-sensitive switched access costs directly from end users.

Currently, interexchange carriers are billed for those costs, which they pass on to users. Under the Nynex proposal, users would have received two bills, one from the local exchange carrier for providing access to the long-distance company and one from the long-haul carrier for long-distance service.

In its proposal, dubbed the End-See Nynex page 46

► SATELLITE AFFAIRS

Two Intelsat officials suspended; loan cited

BY JOHN DIX
Senior Editor

WASHINGTON, D.C. — The International Telecommunications Satellite Organization (Intelsat) last week suspended Director General Richard R. Colino and Deputy Director General Jose L. Alegrett over allegations that the two authorized an improper payment to a broker to secure a \$60 million loan to refinance the organization's headquarters.

Although Intelsat officials would not comment on the case, it is generally believed that the two top officers of the international satellite consortium were suspended for paying an unnamed broker an estimated \$1 million to arrange the refinancing deal.

Colino and Alegrett, who could not be reached for comment, re-

portedly arranged for and signed the broker's payment without consulting the board of governors as required.

Statements reported by other sources say neither man stood to benefit from the deal.

In a prepared statement, Tada-shi Nishimoto, chairman of Intelsat's board of governors, said the two officers were put on administrative leave until the board can review the allegations at its next meeting, Dec. 4.

Questions of impropriety were raised by Intelsat auditors (Peat Marwick Mitchell & Co.) after being asked by Colino himself to trace an earlier payment to the same broker.

Colino had apparently approved a payment to the broker that was arranged by Alegrett, then later stopped a subsequent

payment and initiated an internal audit regarding the first check. Results of that audit were turned over to Peat Marwick Mitchell & Co.

After reviewing the results of the internal audit, the outside firm wrote a letter to Nishimoto reporting what it believed were questionable practices surrounding transactions with the loan broker.

Colino and Alegrett were arranging the refinancing of Intelsat's recently completed headquarters here to help pay back loans from members of the consortium, according to a report in *The Wall Street Journal*. Intelsat is being squeezed by the stiff 14% interest on those loans, the newspaper reported.

The *Journal* also reported that for the fiscal year ending March 31, 1986, Intelsat had revenue of \$457 million and assets of \$1.8 billion.

Until the matter is resolved, John D. Hampton, Intelsat deputy director general for operations and development, is serving as acting director general.

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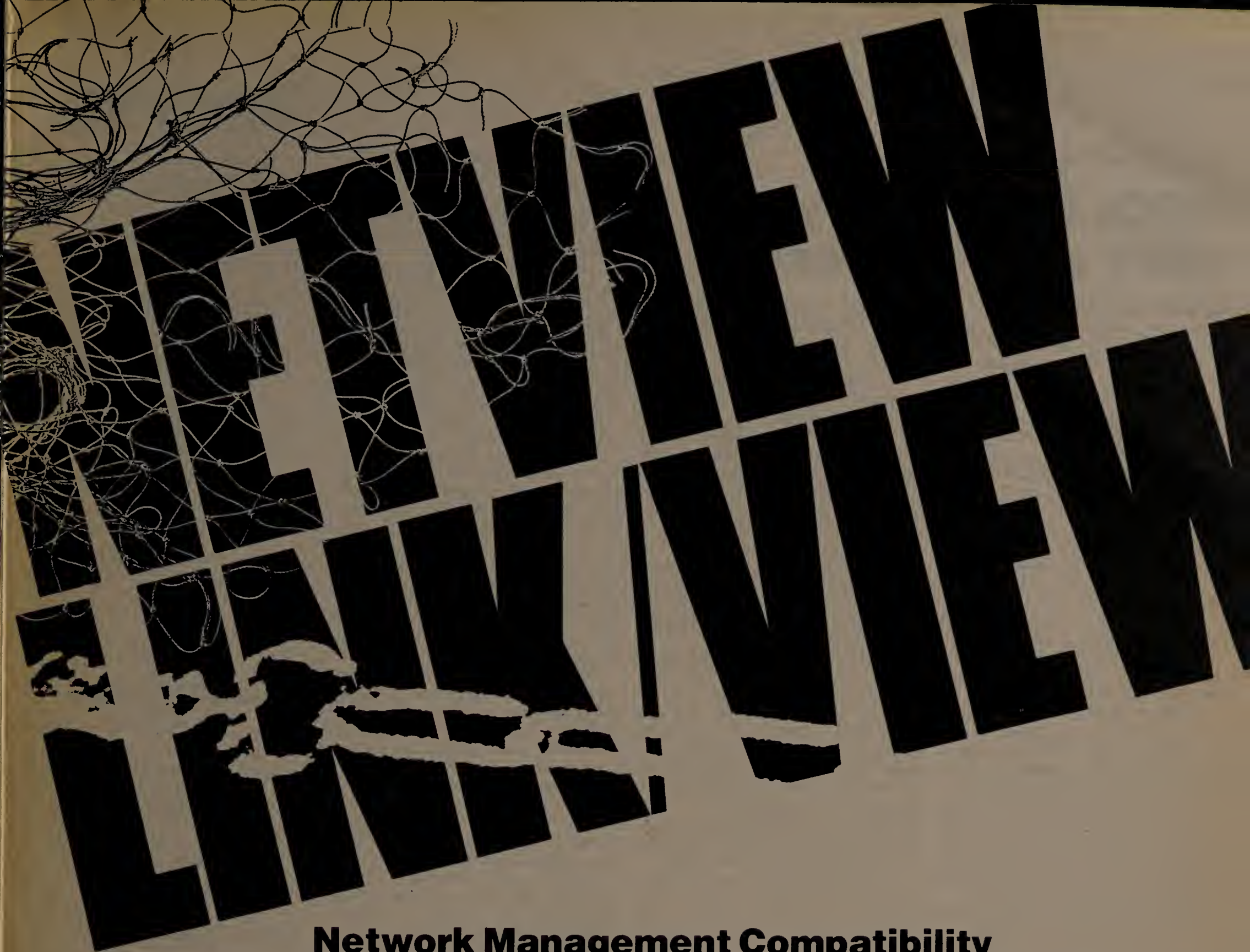
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ultimately extend end-to-end management of non-SNA Timeplex networking devices into the SNA environment. LINK/VIEW provides alarm reporting and network status displays of LINK Family products—LINK/1 T-1 Facilities Management System, LINK/2 Data/Voice Network Exchange, the miniLINK/1 and miniLINK/2 systems.

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► FUTURE NETS

BOCs opt for varying ISDN start-up plans

BY MARY PETROSKY
West Coast Correspondent

SAN FRANCISCO — Despite the emphasis to date on field trials, the Bell operating companies' strategies for implementing Integrated Services Digital Network technology vary widely, ranging from operating company Southern Bell Telephone and Telegraph Co.'s aggressive plans to roll out actual services in early 1988 to holding company Southwestern Bell Corp.'s more conservative approach of conducting two years of laboratory tests.

Representatives from six telephone operating companies discussed their ISDN strategies at the International ISDN Conference held here recently.

Regional Bell holding company (RBHC) US West, Inc. gave details on its first trial, which got under way recently in Phoenix with a phone call that simultaneously carried voice, facsimile and personal computer data. US West, which has the most aggressive trial plans of the companies participating in the conference, expects to have six trials under way by March 1987.

Last week's ISDN call linked the Arizona Department of Transportation, the Arizona Secretary of State's office and Mountain Bell's Phoenix office. The trial employs the so-called 2B+D Basic Rate In-

terface, with two B channels capable of transmitting voice and data and one D channel for signaling information.

By using the Basic Rate Interface, the state government of Arizona has been able to eliminate private lines linking departments involved in the trial, increase the speed of data transmission and eliminate modems. Use of both basic and primary access (23B+D) methods will help participants in other trials eliminate coaxial cable, increase the speed of accessing host computers and consolidate private branch exchange lines, said Loren Henry, director of ISDN planning for US West.

The trial of Ameritech Bell operating company Illinois Bell with McDonald's Corp., which was announced in March 1985 and delayed by software development problems, is slated to begin this Dec. 16. The trial will involve five McDonald's sites, including the company's headquarters in Oak Brook, Ill., and will require the conversion of 400 out of 2,000 Centrex lines to ISDN lines by mid-1988.

Not all telephone companies believe in trials, however. "We're not going to mess with trials," said Kathleen Wilson Kaplan, staff manager of network planning at Southern Bell.

Although the company will forgo trials and focus on providing busi-

ness and residential customers with ISDN services as quickly as possible, Southern Bell does plan to conduct some ISDN testing in 1987 before rolling out its first service in 1988.

Initially, Southern Bell will concentrate on offering enhancements to existing services. While most vendors avoid discussing the costs of ISDN, Kaplan said Southern Bell is aiming at a tariff roughly 1.5 to 1.75 times existing tariffs. As part of its aggressive push, the company hopes to have filed tariffs by fourth quarter 1988.

In gearing up to offer ISDN services, Southern Bell this summer began deploying Common Channel Signaling (CCS) System 7 in the Atlanta area. This signaling sub-network will be separate from and used to control the switches and lines in the company's traffic-bearing network. CCS System 7 will be used to interconnect ISDN nodes, and it will be deployed in the third and fourth quarters of 1987.

While Southern Bell has already signed up customers for its early ISDN services, Southwestern Bell, an RBHC, said it has found that its customers don't want to be guinea pigs for untested technology.

Instead of trials, Southwestern Bell is setting up an ISDN laboratory and will begin testing various vendors' switches and customer premises equipment in January.

Nynex Corp.'s strategy is to offer ISDN-like services now that can eventually be accessed through ISDN connections, said Tom Super, associate director of strategic technology planning at Nynex. "The customer won't wait for ISDN; he See ISDN page 46

► EXCLUSIVE

CDC IBM front end bows

BY PAUL KORZENIOWSKI
Senior Editor

MINNEAPOLIS — Control Data Corp. (CDC) last week threw its hat squarely into the IBM front-end processor ring with the introduction of its XN10 communications processor, a device that moves Systems Network Architecture routing functions out from a host to a front-end processor.

The CDC device functions like an IBM Physical Unit 5.0 system, a designation usually reserved for an IBM host in the SNA world. Typically, IBM's front-end processors function as PU 4.0 devices and rely on a host system to handle many routing functions. CDC's competitors in the IBM front-end processor market, such as Amdahl Corp. and NCR Comten, Inc., offer products that emulate an IBM front-end processor's PU 4.0 capabilities.

By offering PU 5.0 support, CDC has moved many SNA routing functions to the front-end processor. According to Jerome L. Meyer, a product marketing manager at the company, that offers users a number of benefits.

First, paths between the front-

end processor and a terminal can be dynamically established. For example, if a connection is broken, a new route will automatically be established. This can be done by an IBM front-end processor but only if a user loads in alternate routing tables when configuring the device.

Meyer said the dynamic routing capability makes the device suitable for redundant operation. He recommended that customers use the inherent switching capabilities in applications that must be kept up and running.

In addition, CDC's front-end processor enables users to toggle back and forth between host sessions by simply pressing a function key. A number of software packages already enable users to do this, according to L. David Passmore, group manager at Network Strategies, Inc., a Fairfax, Va., consulting firm.

The XN10 attaches directly to an IBM block multiplexer channel and transmits data at speeds of 24M bit/sec. The device can support 250 communications lines operating at speeds from 110 to 64K bit/sec. Also, the XN10 can use a channel-to-channel connection, such as an

IBM 3088 Multisystem Channel Communications Unit.

The communications processor supports IBM's VTAM 3.0, which includes an Extended Network Addressing capability that enables users to construct networks with as many as two million devices. The CDC device can be used with 16 local or remote hosts and is geared to IBM users with multiple hosts. An XN10 system that supports 196 communications lines and two hosts is priced at \$565,000.

How successful Control Data will be in the mature IBM-compatible front-end processor market is questionable.

To begin with, the company will have to convince users that its product will function as promised in SNA networks. Also, the product lacks X.25 and T-1 interfaces, features that other vendors already offer. Meyer said projects are under way to develop those interfaces.

On the positive side, Passmore noted that there are less than six players in the IBM front-end processor market. But those players are well-entrenched and familiar to users. To its credit, CDC has an established sales and support force that has experience in selling and installing systems to large users. CDC is hoping the device's SNA routing capabilities will attract users. □

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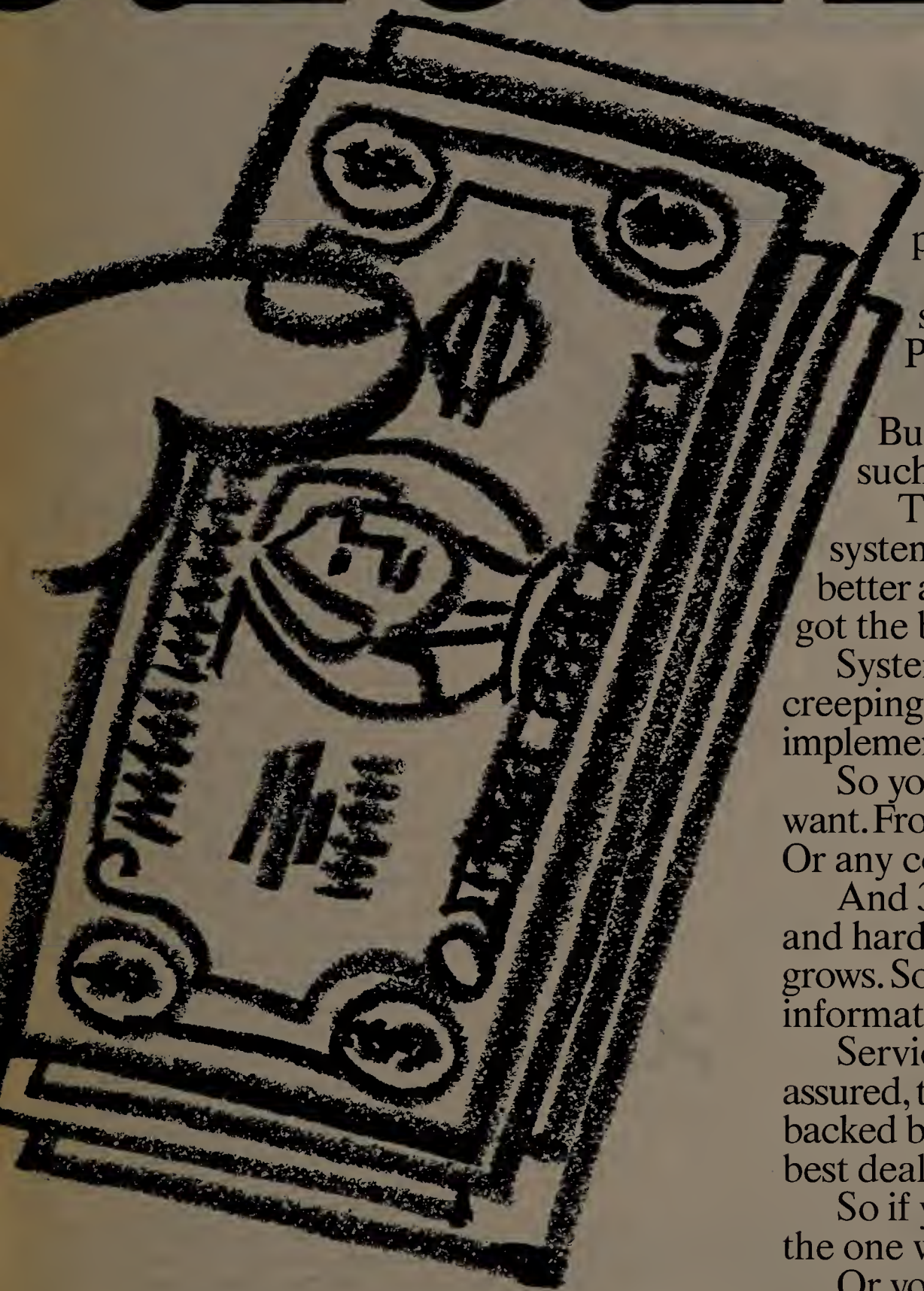


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► NETWORK STRATEGIES

Fast net aids Schwab

BY MICHAEL FAHEY
Staff Writer

SAN FRANCISCO — Charles Schwab & Co., the discount brokerage firm based here, boasts that its data communications network is a strategic weapon rather than merely an "overhead department."

In a national magazine advertisement, Schwab Executive Vice-President Woodson Hobbs claims the Schwab communications net makes it possible for the company to complete a stock transaction while a

client waits — that is, if the client is willing to hang on the telephone for 10 seconds. "At Charles Schwab," the ad proclaims, "data communications is not an overhead department; it's a competitive advantage."

Schwab's director of telecommunications, Mike Ryan, backed up his boss's claims, adding that customers usually don't have to wait that long.

"Our No. 1 goal is availability. Our No. 2

goal is response time," Ryan said. "The quicker our network response time is, the quicker our agents can get one customer off the line and get to the next person in the queue."

Ryan estimated that the company processes nearly 800,000 customer transactions per day. "One thing everybody at the company understands is that the way to keep customers happy is through good service," Ryan said.

In addition to its San Francisco headquarters, Schwab has some 92 branch offices and about 30 other offices in facilities such as stock

exchanges.

"Our network isn't large compared to some,"

he observed. "But what makes us unique is that at every location, we support some sort of data communications back to headquarters."

The hub of the Schwab network is a Rolm Corp. VL Computer Branch Exchange (CBX) comprising one 9000 processor and two 8000 processors. The San Francisco facility also has two smaller model CBXs. Thirty-six of the brokerage house's largest branch offices are equipped with Rolm CBXs, including 31 VS models. The San Francisco facility also has three IBM 3725 front-end processors and a 3090 mainframe.

The network stars out to remote stand-alone IBM 3725s at regional facilities in Los Angeles, Dallas and Chicago. Those facilities are connected to the head office by private lines supporting AT&T's 56K bit/sec Dataphone Digital Service. These lines are backed up by switched 56K bit/sec service provided by MCI Communications Corp. The company's branch offices are connected to the regional facilities by 9.6K bit/sec private lines using IBM modems.

Schwab places a great deal of emphasis on redundancy, Ryan said, and it has a facility in Manhattan capable of backing up the entire system. "In New York, we have enough dial-up links to dial into and acquire Dallas, Chicago and Los Angeles if there is ever a major failure in San Francisco," he said.

The Manhattan facility is equipped with two IBM 3725s and a 3083 CPU. It is connected to the San Francisco office via two dedicated 56K bit/sec private lines from AT&T backed up by dial-up 56K bit/sec service from MCI.

The company's computer capacity has grown by more than 1,000% in the last two years, according to Ryan. "There are two reasons for that growth," he said. "Schwab is continually growing and getting a larger share of the market. Also, the volume on the stock exchange has increased tremendously." The company claims to be growing at 50% annually.

Ryan said Schwab is constantly seeking to develop new applications to support its customers' trading. The company has instituted a stock quotes distribution system using 12 IBM Series/1 minicomputers located throughout the country and linked to Schwab's San Francisco office.

Customers can call one of the 12 locations and key in assigned access numbers using the push buttons on their telephones. In addition, customers accessing the quote service can also receive news through the Dow Jones & Co., Inc. news service. The stock quotes are free, and the customers pay a per-minute rate to access the news service, Ryan said.

The Series/1s are equipped with IBM's voice digital conversion card, referred to as a TCA card, he explained.

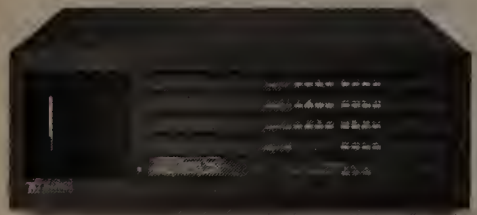
"Customers key in their account number and stock service number, and the Series/1 will speak back to them and give current market quotes." □

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Why buy an X.25 box that masquerades as a system—when you can buy an X.25 system for the price of a box?

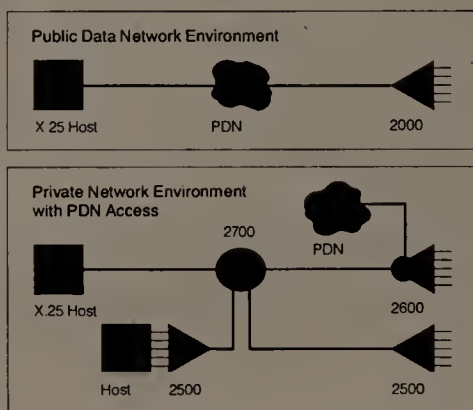
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INDUSTRY UPDATE

Regional Bell holding company dependence on access charge revenue in 1985

	Percent of total revenue
Ameritech	26.8%
Bell Atlantic Corp.	27.0%
BellSouth Corp.	30.8%
Nynex Corp.	NA
Pacific Telesis Group	32.7%
Southwestern Bell Corp.	38.0%
US West	33.1%

With the conclusion of most conversions in 1986, the major long-distance companies and their regional Bell holding companies will shift their focus from the residential user to the corporate user.

SOURCE: THE YANKEE GROUP, BOSTON

CONGRESSIONAL SCORECARD

New players set to tackle new issues

Democrats take over key seats for telecommunications policy.

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — Recent election losses suffered by Senate Republicans will change the makeup of the key committees that deal with telecommunications policy and rewrite the agenda of issues to be tackled during the upcoming 100th Congress, which convenes in January. Most committee assignments will likely be made at that time.

Democratic victories in last month's elections ousted Sen. Robert Dole (R-Kan.) from the Senate Majority seat and Sen. John Danforth (R-Mo.) from the chairmanship of the Senate Commerce Committee, which is the parent committee of the Communications Subcommittee. Legislation introduced late this year by Dole to transfer jurisdiction over the Modified Final Judgment from the U.S. District Court and Department of Justice to the Federal Communications Commission is stalled in the Commerce Committee due to strong industry opposition and lack of commitment from Senate leaders. The removal of Dole and Danforth from leadership positions may have killed any future chance of passage for the so-called Dole bill.

Another loss to the Republican-led Senate was Sen. Barry Goldwater (R-Ariz.), chairman of the Communications Subcommittee of the Commerce Committee, who retired this year. Sen. Slade Gorton (R-Wash.) of the Commerce Committee lost his re-election bid to Democrat Brock Adams, former Carter administration secretary of transportation.

Sen. Ernest Hollings (D-S.C.) is a shoo-in for the Commerce Committee chairmanship. Hollings has a strong interest in trade matters and international telecommunications trade issues could be on his agenda. The chairmanship of the Communications Subcommittee could also go to Hollings if he wants it, although many believe he does not. That would leave the seat open to the ranking Democrat Sen. Daniel Inouye (D-Hawaii). Next in line for that seat is Wendell Ford (D-Ky.).

Hollings has been an opponent of telephone deregulation and took a strong stand against the pro-deregulation forces in the access charge debate waged in Congress last

See **Congress** page 12

Communications scholarships offered

The Data Communications Division of the American Institute will be awarding 20 \$5,000 scholarships to qualified communications personnel toward their continued professional advancement. The application deadline is Dec. 31, 1986. Award recipients will be announced by Jan. 31, 1987.

CONSULTANTS CONFERENCE

IBM lays out its future net plans

SNA will be basis for networking advances.

BY PAM POWERS

Senior Editor

SAN DIEGO — IBM revealed its master plan for improved network management, integrated voice and data capabilities and multivendor connectivity during the Society of Telecommunications Consultants (STC) Conference held here recently. Big Blue's briefing was one of several offered by major industry players that reflected user concerns about compatibility with emerging standards and new technologies.

At the conference, Patrick Noon, senior marketing support representative for the Raleigh Telecommunications Marketing Center, outlined a multipronged strategy that will shape the communications products to be introduced by IBM and its Rolm Corp. subsidiary in the coming decade. Noon said IBM intends to help users build

"architected, enterprisewide" voice and data networks with customer-based control and management. Those nets will support equipment from a variety of vendors through support for internationally accepted standards.

The tone of the address suggested that IBM is struggling now to better accommodate shifts in user needs it may have ignored in the past. Noon emphasized IBM's role in the movement toward distributed networking as the company migrates from a hierarchical network architecture to peer-to-peer connectivity in the next few years.

In an effort to improve utilization of lines for integrated voice and data, IBM said it is working to develop the capability for dynamic bandwidth allocation, so that, in times of heavy data traffic, a voice chan-

See **STC** page 11

INDUSTRY EYE

PAM POWERS

Vendors blur the line between fantasy and reality for users

Vendors in the communications industry are starting to lose at their own game. What has developed is a vicious cycle of trying to top the other fellow in order to bring in the most money from a limited pool of user dollars.

The key to success lies in the glossies, and particularly in the last couple of years, the braggadocio contained within some of them either weaves tales of fantasy about product capabilities or suggests a need for certain capabilities that simply does not exist in the real world.

This is achieved by preannouncing products with delivery dates in the next millenium and by dressing up new product introductions with claims of capability that also cannot be met in any immediate sense.

But the real irony lies in the fact that vendors have convinced users they need, for instance, an extremely high throughput that's trumpeted in the glossies but may or may not be available upon request. All the hype has created an artificial need for increased throughput, at the expense of

both the user and the vendor.

In fact, studies have shown that the average movement in terminal speeds has not increased significantly in recent years. After all, the average human has limited typing and reading speeds that, in many applications, determine the efficiency of the information flow. Granted, for high-volume and computer-to-computer applications, speed is paramount, but the perceived need overall is bloated in comparison to the true need.

So now the vendors are scrambling to spend money to offer increased sophistication, and the users are scrambling to buy it. Consequently, a high percentage of the equipment on shop floors is significantly underutilized and will be for some time to come.

Given the state of things, it is a wise man who looks beyond all the preening going on to establish first what his real needs are and then to purchase on that basis. Growth within the organization is inevitable, but with a tight budget, it's advisable to assess your company's growth needs based on your own criteria, not the vendor's.



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BRIEFS

BellSouth Enterprises has formed a new company, **BellSouth Advanced Networks, Inc.**, to market enhanced services, including dial access to packet switching and protocol conversion, provided by the BellSouth Corp. telephone companies.

BellSouth Advanced Networks will market the services throughout the nine states served by **South Central Telephone Co.** and **Southern Bell Telephone and Telegraph Co.** The services offered will include conversion of asynchronous signals to X.25 signals and X.25 conversion to X.75.

AT&T has contracted with **Illinois Bell** and its customer, **McDonald's Corp.**, to provide customer premises equipment for use in McDonald's upcoming Integrated Services Digital Network trial. AT&T will provide, among other equipment, terminals capable of offering basic and advanced voice services as well as circuit and packet-switched data. ISDN terminal adapters supporting a variety of data interfaces will also be supplied.

The trial, to begin later this year, is designed to focus on the customer premises equipment/switch interface.

BICC Data Networks of England and **Bridge Communications, Inc.** of Mountain View, Calif., have signed an agreement under which BICC will supply a range of products for use in Bridge Communications' local-area networks. Products include copper and fiber-optic repeaters, multiport repeaters, cluster controllers and transceivers from BICC's Isolan line.

InteCom, Inc., a subsidiary of Wang Laboratories, Inc., has signed a contract for its **Integrated Business Exchange (IBX)** with **Martin Marietta Data Systems**, a division of Martin Marietta Corp. The voice/data switching system will provide telecommunications services to facilities in Englewood, Colo. The IBX S/10 Martin Marietta Data Systems selected will replace an AT&T Dimension 2000 PBX.

Applitek Corp., a communications company specializing in local-area network technology, has completed private placement of \$6 million in equity funding. With the completion of the financing, **Infotron Systems Corp.** has obtained a 40% equity interest in Applitek by purchasing 12 million shares of Class B Convertible Preferred Stock of Applitek for \$6 million.

Paradyne Corp., headquartered in Largo, Fla., has announced the signing of an OEM agreement with **Tesdata Systems Corp.**, headquartered in Herndon, Va. Under the agreement, Paradyne will have the ability to include Tesdata's Smart network performance monitoring family of products as part of any Paradyne integrated network proposal. □

STC from page 9

nel could be shut down to increase the capacity for data transmission. IBM is also experimenting with the idea of embedding voice bits in the data stream to allow for simultaneous transmission of voice and document signals.

With some 20,000 Systems Network Architecture backbone networks in place, IBM said it will continue to use SNA as a springboard for future product enhancements.

Among these will be peer-to-peer networking at all levels, interfaces for systems based on international standards, resource-sharing options, standardized record formats for voice and data, and the development of standard framing and format structures so that layers of the SNA architecture can be changed without affecting other layers.

Traditionally weak in network management, IBM indicated it is moving to make improvements in

this area, too, with enhancements to the NetView product that will provide problem, change and configuration management; performance/traffic analysis; and accounting and operations management. The company said it perceives a desire on the part of users to maintain control of all facets of the network from end to end, and it is working to fulfill those desires.

Additionally, Noon said the company is actively promoting the adoption of the Open Systems Interconnect model and is prepared to support Integrated Services Digital Network, specifically through Rolm's CBX II private branch exchange, as specifications emerge over the next few years. □

"IBM is actively promoting the adoption of the OSI model."

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► INTERNATIONAL

CXC scores new equity investors, distributors

IRVINE, Calif. — CXC Corp., maker of the Rose voice/data private branch exchange system, last week scored a coup with a multi-million-dollar investment by the French company Societe Anonyme de Telecommunications (SAT) and a long-term alliance with Autophon AG of Switzerland.

In addition, Sony Corp. increased its equity investment, which includes a technology license and manufacturing and dis-

tribution rights, in CXC.

The alliance falls upon the heels of an earlier CXC agreement with Sony, in which the latter company gained rights to manufacture and distribute the Rose product in Japan.

Under the agreement, SAT and Autophon will exchange technology and manufacturing licenses toward joint development of enhancements for the CXC Rose product.

SAT, with 1985 sales of more than \$1.5 billion, markets telecommunications equipment primarily to French businesses. Autophon had sales of \$336 million last year from sales of PBXs and other communications systems. The two companies will receive exclusive manufacturing and sales rights in Western Europe, with nonexclusive rights in other countries. □

Congress from page 9

year. Hollings did not participate in the Dole legislative hearings in the Commerce Committee this year, and it is believed he will oppose similar legislation if it is introduced next year.

Another telecommunications

player, Sen. Timothy Wirth (D-Colo.), has moved over from the House to the Senate. Having served as chairman of the House Telecommunications Subcommittee, Wirth could try for appointment to the corresponding Senate subcommittee, although many believe he will lay off telecommunications issues for a while.

Wirth's old House post at the Telecommunications Subcommittee will go either to Rep. Al Swift (D-Wash.) or Rep. Edward Markey (D-Mass.). Markey has seniority over Swift, although Swift has been more closely involved in telecommunications issues. Swift has often been closer to Rep. John Dingell, the chairman of the parent Commerce Committee, on many telecommunications issues.

The new Congress is expected to focus more of its attention next year on its oversight responsibilities, especially over the FCC, in the telecommunications industry, rather than on new legislation. Congress may decide to rein in the FCC, which took advantage of the divided Congress this year (Republican-held Senate and Democrat-dominated House) to expand its authority, according to Thomas Rogers, senior counsel of the House Telecommunications Subcommittee, speaking at an Annenberg School seminar on the elections.

Trade reform is also expected to top Congress's list of issues in the

WHEN IT COMES TO BUILDING WIDE-AREA NETWORKS, THERE'S NO SUBSTITUTE FOR EXPERIENCE.

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Experience that includes designing and building the world's first packet-switching network for the U.S. government back in 1969. Since then, it has evolved into the world's largest wide-area network, the Defense Data Network, connecting over 30,000 users throughout the world.

But the U.S. Government isn't the only customer with tough networking problems that BBN has helped to solve. Numerous major corporations, among them Wang, Weyerhaeuser, and MasterCard, not to mention European giants like England's National Westminster Bank and Italy's largest corporation, ENI, have also found the answers they were looking for from us. Each came to BBN with a unique networking problem—from integrated voice/data transmission to electronic mail to credit authorization—and each came away with a unique networking solution.

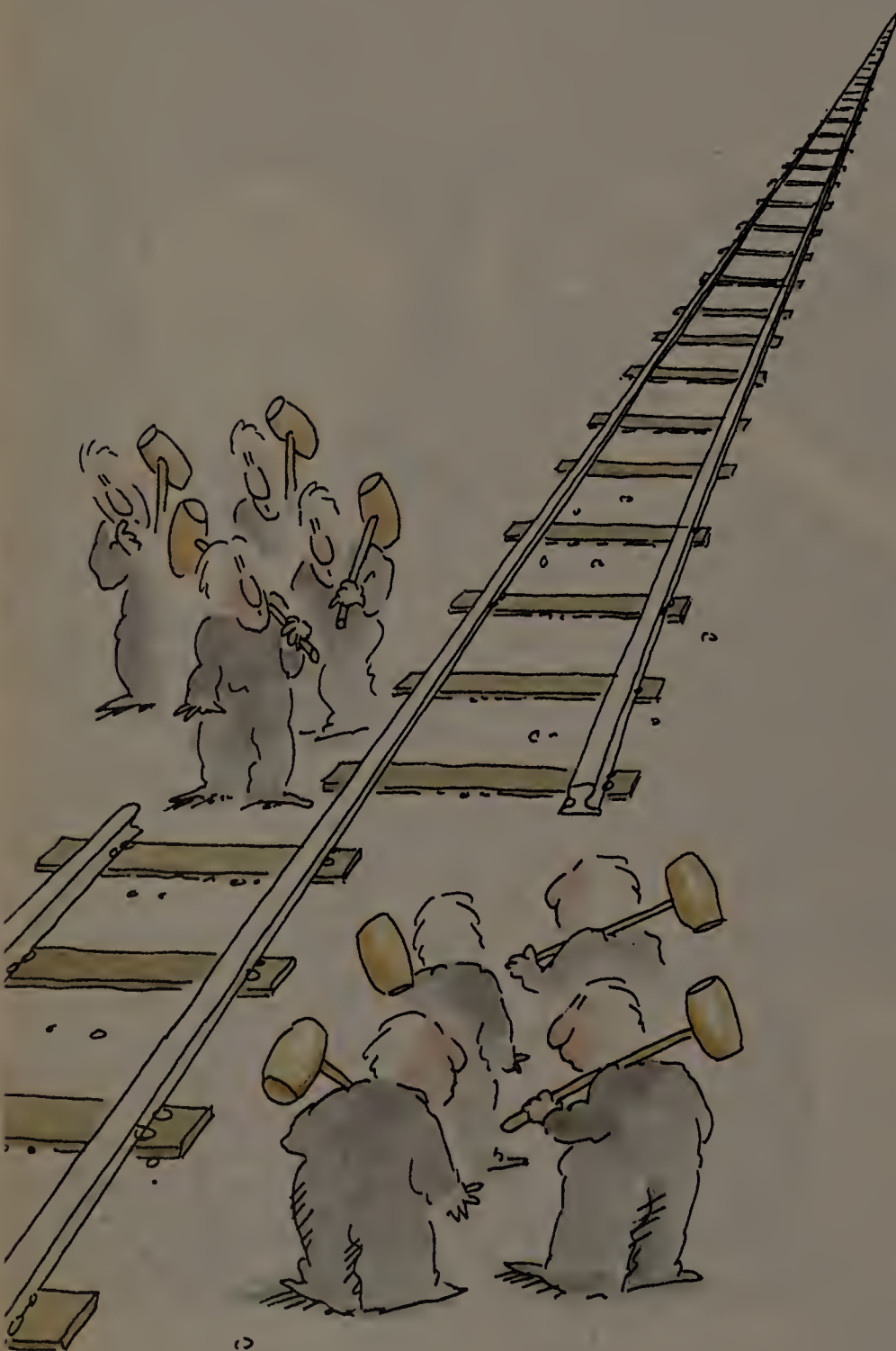
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*“Local
exchange
carriers are
looking to
charge
consumers
higher access
fees.”*

early months next year, with Congress advocating greater market penetration for U.S. telecommunications firms, Rogers noted.

R.T. Gregg, National Telecommunications and Information Administration congressional liaison, said the Communications Satellite Corp./Contel Business Networks merger will also be a hot topic. Congress will forge a strategy on how the executive branch and the FCC will deal with the issue of free and fair trade in international markets, he said. The access charge issue will rise once again and reach the floor of the Congress, in the form of a grassroots campaign, commented Dale Brown, congressional assistant to FCC Chairman Mark Fowler. Local exchange carriers are looking to charge consumers higher access fees and the issue could go before Congress again. Proconsumer forces are concerned over ever-rising local telephone rates. □

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TELECOM TRENDS

Third quarter earnings for AT&T and regional Bell holding companies

Company	Third quarter revenues	Third quarter net income
AT&T	\$8.42b	\$533m
Ameritech	\$2.34b	\$292m
Bell Atlantic Corp.	\$2.48b	\$298m
BellSouth Corp.	\$2.89b	\$399m
Nynex Corp.	\$2.87b	\$314m
Pacific Telesis Group	\$2.31b	\$285m
Southwestern Bell Corp.	\$1.96b	\$258m
US West	\$2.14b	\$268m

SOURCE: NORTH AMERICAN TELECOMMUNICATIONS ASSOCIATION, WASHINGTON, D.C.

► PACKET-SWITCHED NETS

Bell Penn free to fly PDN service

State PUC gives okay to offer Public Data Network in-state.

BY BOB WALLACE
Senior Editor

PHILADELPHIA — Bell of Pennsylvania recently won permission from the Pennsylvania Public Utility Commission to offer intrastate Public Data Network (PDN) packet-switched data service.

PDN service, which initially will be available here and in Pittsburgh, can be accessed through existing dial lines or dedicated voice-grade lines. The service can also be accessed through so-called packet-switched access lines that link host processors using the X.25 protocol, or inter-local access and transport area carriers using the X.75 protocol, to the packet-switched net. The network handles protocol conversion tasks.

Users accessing PDN through existing exchange lines must dial a 7-digit number that routes calls to a Packet Serving Office (PSO), a central office equipped to provide access to PDN. Calls are terminated on a multiline hunt group, where each line is linked to a dial-up modem and a port on an access concentrator in the PSO.

Dial-up customers will pay existing exchange rates for connection to the access concentrator. The company said the calls will be local calls in most cases. In addition to the dial-access rate, connection time to the PDN will be charged based on minutes of use and the number of packets, measured in kilopackets, transmitted. Direct-access customers will also be charged for kilopackets but not for minutes of use. Direct-access customers will be assigned a network address known as a Network Terminal Number, analogous to a telephone number in the switched network.

The company says PDN offers an economical data transmission alternative because it allows a number of customers to share existing transmission facilities. Bell of Pennsylvania received permission from the Federal Communications Commission in June to offer PDN services on an interstate basis.

Bell of Pennsylvania said typical applications to be supported by PDN include electronic mail, customer billing, order entry and remote data base access.

A Bell of Pennsylvania spokesman said the first minute of use of the new service is split into two 30-second segments and is billed on a full-minute charge for additional minutes. The per kilopacket charge ranges from 44 cents to 50 cents. □

New Accunet packet service access option

AT&T has proposed to add 2,400 bit/sec analog or digital access to its Accunet packet service. The proposal, which could become effective Dec. 29, would call for a user to pay an installation fee of \$300, a monthly charge of \$150 per port and a minimum usage charge of \$120 per month. Current access options to the Accunet packet service network include analog at 4.8K and 9.6K bit/sec and digital at 4.8K, 9.6K and 56K bit/sec.

► 800 SERVICES

Newcomers offer cost-cut features

MCI, W. Union plan call routing, blocking.

BY MICHAEL FAHEY
Staff Writer

Users subscribing to the soon-to-be-offered Western Union Corp. and MCI Communications Corp. 800 services may be able to benefit from some money-saving features, including regional call routing, call blocking and call detail recording, options not currently offered with most existing 800 services.

MCI and Western Union's 800 services will both boast regional call routing, which allows users to direct incoming calls to specified facilities, and call blocking, which lets users block calls from selected geographic regions. Both services will ini-

tially let users block calls at the switches the companies use to support the service, but MCI has promised to enhance the feature to allow users to block calls by area code.

Western Union's service will cost \$100 per month per line. In addition, users will pay \$150 extra per month for blocking, regardless of how many regions are blocked. MCI has not determined pricing for its 800 service. Currently the only 800 service that allows users to block calls from selected areas of the country is AT&T's Megacom 800 service.

The benefits of call blocking and call routing are twofold. Users can save money

See 800 page 18

CROSS TALK
BOB WALLACE

AT&T's potent price cuts put squeeze on MCI, US Sprint

If approved, AT&T's \$1.2 billion long-distance service rate reductions will apply tremendous pressure on MCI Communications Corp., US Sprint Communications Co. and other common carriers.

AT&T has a huge advantage in this latest round of cost-cutting wars because its long-distance network is already in place. Both MCI and US Sprint, however, are hastening construction of their long-distance networks. At the same time, both carriers are struggling to keep pace with AT&T's repeated rate cuts.

Industry analysts have already predicted AT&T will be forced to lop several hundred million dollars off its 1987 net income because the

Federal Communications Commission ordered AT&T to decrease its rate of return on investment from 12.75% to 12.2%.

The price gap between AT&T's services and those of its prime competitors is quickly narrowing, as both

MCI and US Sprint have openly acknowledged ("AT&T chops long-haul fees, ups leased lines," NW, Nov. 24). The user has to wonder how much longer carriers other than AT&T can afford to pour enormous sums of money into network expansion and still manage to keep long-distance service prices below AT&T's.

Consider MCI's plight. This long-distance service provider has spent \$4 billion on network construction to date. MCI has already earmarked an additional \$900 million for network expansion next year and an additional \$800 million for network building in 1988. MCI's total capital outlay for network construction and improvement will likely total \$5.7 billion by year-end 1988.

MCI hopes to have 5,500 fiber-optic and 7,500 digital microwave route miles operational by year end. The carrier predicts a total of 10,000 fiber-optic and digital microwave route miles will be opera-

See Miles page 14

"AT&T has a huge advantage in this round of cost-cutting wars."

► NETWORK MANAGEMENT

SynchroNet users gain

Southern Bell Telephone and Telegraph Co. and South Central Telephone Co. announced their intention to provide users with a customer-controlled network management feature on SynchroNet service, a digital data service offered in nine Southeastern states.

The new feature, dubbed the Secondary Channel Capability, will provide SynchroNet users with a variety of statistical information concerning the status of their networks. The new capability reportedly would work with AT&T's Da-

taphone II, Racal-Milgo's CMS 200, Paradyne Corp.'s 5500 and Data-tel's DCP 3800 network monitoring systems. Secondary Channel Capability enables users to derive an additional channel for simultaneous alarm or low-speed data transmission during normal operation.

Secondary Channel Capability will enable users to monitor the elements of their data networks, isolate network problems, restore their networks by equipment substitution or by rerouting facilities, and gather network operation data.

Don Wasden, SynchroNet service product manager for BellSouth Services, Inc., said the BellSouth operating companies will file tariffs with the Federal Communications Commission to offer the network management capability by year end. If approved by the FCC, the feature would be available to SynchroNet users by the end of the first quarter of 1987.

Both Southern Bell and South Central Telephone have offered SynchroNet service since 1984. SynchroNet offers point-to-point digital service at speeds of 2,400 bit/sec, 4.8K bit/sec, 9.6K bit/sec and 56K bit/sec. The multipoint version of the service is available at 2,400 bit/sec, 4.8K bit/sec and 9.6K bit/sec. □

► LONG DISTANCE

ITT offers private-line enticement

SECAUCUS, N.J. — In a move designed to promote its private-line service, ITT Corp.'s long-distance telephone unit has begun offering new customers a one-month trial use of up to five private lines for no charge.

The offer, which includes free line installation, is valued at \$8,000.

To qualify, new ITT private-line customers who have at least \$2,500 in monthly long-distance charges may order up to five private lines between now and Dec. 31. The customers must order installation by Feb. 28, 1987 to take advantage of the promotion.

Current ITT private-line customers are not eligible for this promotion. These ITT private-line users pay a flat monthly fee averaging \$675 and a per-line installation fee of \$225. ITT's U.S. Transmission Systems, Inc. (USTS) unit offers terrestrial private-line services between more than 50 major cities and their surrounding metropolitan areas.

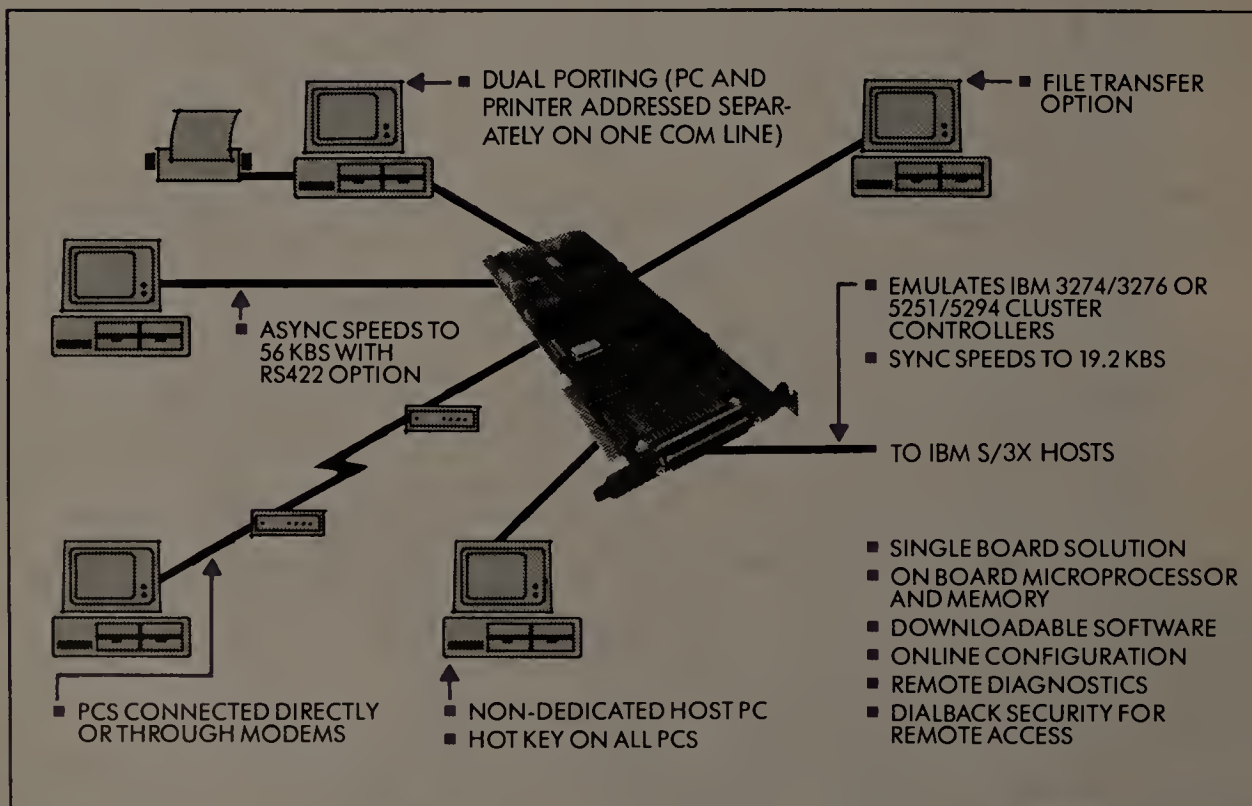
USTS is part of ITT Corp.'s Communications Services Group, which offers domestic and international telex and data communications services in addition to long-distance telephone services. □

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Miles from page 13

tional by year end. The carrier predicts a total of 10,000 fiber-optic and digital microwave route miles will be operational by the close of 1988. Once completed, MCI will boast a 40,000-mile network.

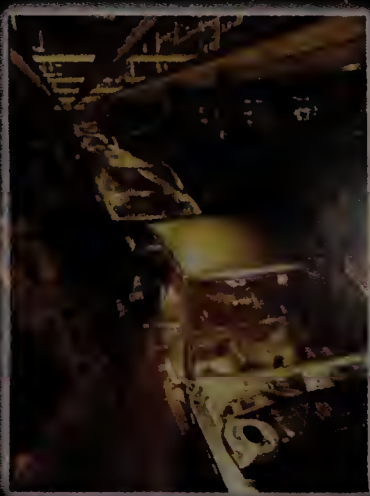
Consider the plight of US Sprint. When the dust from network construction settles, US Sprint will likely have spent \$2 billion on the system. In addition, this carrier currently pays AT&T \$300 million per year for leased facilities it uses in its network.

The carrier eventually intends to migrate all traffic off these network segments and onto its yet to be completed, nationwide fiber-optic network. Although roughly 14,000 of the lightwave cable miles for US Sprint's network are already in the ground, only 6,000 to 7,000 of those route miles are currently operational.

Long-distance carriers such as ITT Corp., National Telecommunications Corp., Allnet Communications Services, Inc. and Cable & Wireless North America, Inc. — several of whom have already planned large communications networks — are now in the position of scrambling for long-distance service market share. These other common carriers will need to adopt creative marketing strategies for the sale of long-distance services if they are to keep their heads above water. □

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ON LEASED
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800 from page 13

by not having to accept calls from areas where they don't do much business. Users can also balance their toll-free calling loads by distributing calls more evenly among different locations.

"Suppose you have a defined market area. With these services you can eliminate calls where you don't do business," said Robert Self, president of Market Dynamics, a New York-based consulting company. "You can also use the call routing capabilities to distribute calls to different company locations and balance the call load."

For example, Self said, a company could have all of its 800 calls coming from west of the Mississippi routed to its Los Angeles office,

while calls from east of the Mississippi could be routed to the company's New York location. Users can also route calls to take advantage of off-peak rates, since calls are billed according to the time of day at the receiving location.

Western Union is already selling its 800 service to customers and plans to make the service available in January. MCI expects to have its

800 service on-line by the Spring. The two new services will offer call detail recording, which AT&T does not offer.

"Call detail recording is a big, big plus," Self said. "It really helps you track where your calls are coming from, and it cuts down on abuse of 800 service."

Both MCI and Western Union's offerings are based on a concept

known as virtual banding. With virtual banding, users do not have to order separate lines for distinct geographic regions in order to get the lowest price for calls.

With regular 800 service, the country is divided into bands. Band one allows callers in neighboring states to call free to the 800 subscriber who is charged for the call. Each successive 800 band the user subscribes to gives a wider geographic coverage for the service. A user opting for band five service, for example, would be able to offer 800 service throughout the nation.

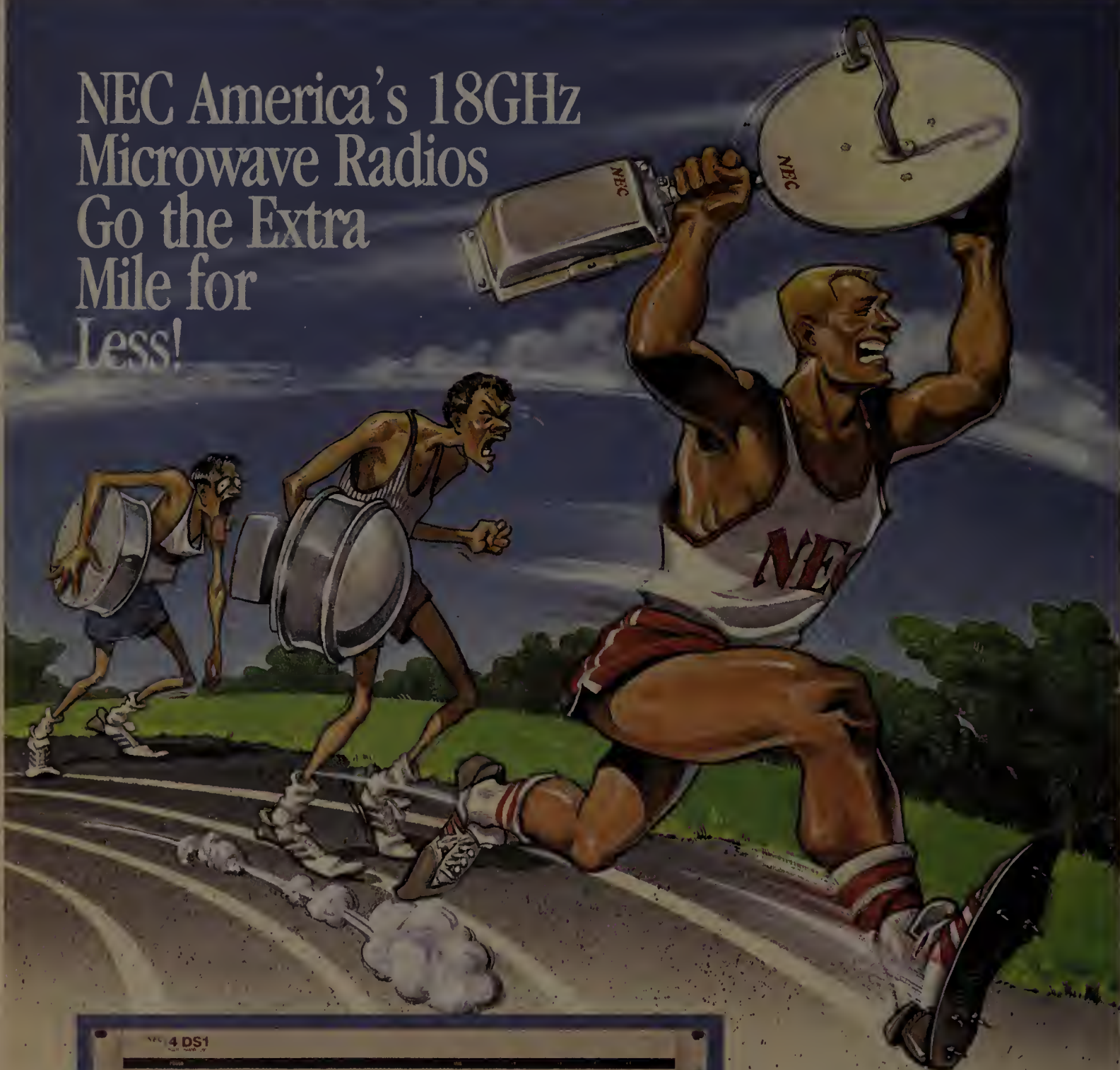
"With our service, you pay the rate where the call originates," said Larry Ciotto, Western Union's director of marketing for long-distance services. "If the call is from close by you pay a lower rate, and if it is farther away you pay a higher rate." MCI's 800 service will work the same way, said company spokesman John Houser.

According to Self, the virtual banding capabilities offered by the two companies simplify users' ordering of 800 service. "You don't have to buy different bands," Self said. "You don't have to specify that you need four band ones and 15 band twos. You just buy the total number of lines you need."

Currently, only AT&T's Megacom 800 service is based on virtual banding. Customers subscribing to

"With these services you can eliminate calls where you don't do business," said Robert Self.

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NEC America's 18GHz Digital Microwave Radio is miles ahead of our competition in every way but one — its price.

For example, our systems link your local access network over greater distances than 23GHz radios. By using the economical and uncongested 18GHz narrow band, NEC America's advanced transmission capabilities provide better performance with twice the availability of 23GHz microwave systems.

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C&C
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Our digital radios have four independent T-1 lines (96 channels) built right in — there's no need for any external multiplexing equipment. Two analog service channels easily provide for your alarm, supervisory, or order wire requirements.

And we offer several different configurations to choose from, the most compact weighing under 40 pounds with a two-foot parabolic antenna.

Best of all, you get all these standard features at a price that puts the other manufacturers where they belong — in second place. So, don't hold back — get the leader of the pack.

Call Radio Marketing at (703) 698-5540, or write: Radio Marketing, NEC America, Inc., Radio & Transmission Marketing Sales Division, 2740 Prosperity Avenue, Fairfax, VA 22031.

NEC
NEC America, Inc.

"The two new services will offer call detail recording, which AT&T does not offer."

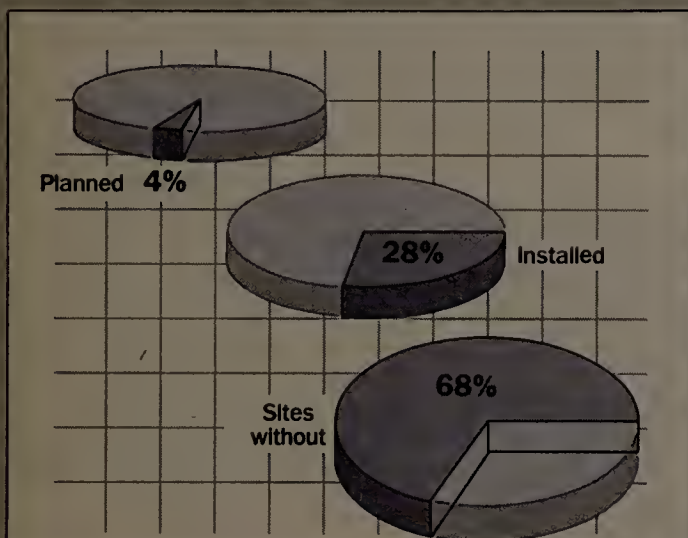
AT&T's other 800 services have to order lines for specific bands in order to define the geographic regions they want to serve.

AT&T's Megacom 800 service currently allows users to block by area code or by geographic band. Customers with regular 800 service must take all of the calls from the bands that they have. Megacom costs \$1200 per month.

AT&T's Advanced 800 service allows users to route calls to different service centers. The service is termed "customized call routing" but AT&T has filed to change the name of the service to "area code routing," to more accurately reflect the service's capability. Users subscribing to this service can have calls from specified areas programmed to receive a recorded message saying that the user does not provide 800 service for that area. The service costs \$100 per month plus 35 cents for each call that receives the recorded message. □

DATA DELIVERY

Protocol converter company sites



SOURCE: COMPUTER INTELLIGENCE CORP., LA JOLLA, CALIF.

“It shouldn’t be too surprising that some of the computer manufacturers are having trouble adding telecommunications services to their product lines. After all, these companies are used to selling computers, not communications products.”

Joaquin Gonzalez

Service director, Enterprise Network Services
Gartner Group
Stamford, Conn.

► ANALYSIS

Mixed bag for digital switch mart

Growth in some areas, slowdown in others.

BY PAUL KORZENIOWSKI
Senior Editor

FRAMINGHAM, Mass. — What the future holds for the digital switching market depends in large measure on which segment of the market is considered.

In its recent report, “Digital Switching Markets,” International Data Corp., a market research firm based here, predicted that some market segments, such as matrix

switching, will prosper. The outlook for others, including patching, isn’t so promising. IDC’s study examined the markets for three product lines, including patching, data private branch exchanges and matrix switches.

Patch panels, developed in the early 1970s, are manual devices that enable a user to transfer lines from one peripheral device to a second whenever a line fails. The report predicted only 3% annual growth for the patching market through 1990.

On the positive side, patching is a proven approach to cable management and will remain so for the foreseeable future. Patching is very easy to maintain.

Users tend to remain with the vendor initially chosen, but they seem to be moving to new avenues to purchase their equipment. They are moving away from purchasing the equipment from manufacturing representatives and distributors and toward buying it from a vendor’s direct sales force.

On the down side, however, patching equipment is very durable, which limits replacement sales. Since the market is mature, vendors are unable to attract new customers with bells and whistles, improved capabilities and price cuts. Also, the emergence of new technologies, such as sparing and switching, is eroding the patch market.

Data PBXs regulate traffic between a front-end processor and terminals vying for access through a limited number of ports. The data PBX handles asynchronous transmission on a first-come, first-served basis.

Prices range from \$120 to \$250 per port, and configurations can be as small as eight ports and as large as 4,024 ports.

The data private branch exchange market experienced low or negative growth in the last few years, according to IDC. Despite that, the company predicted robust growth, 11% annually, for this market segment, through 1990.

IDC said the digital PBX market is in transition. Innovation could spur future sales. Products are expected to include features such as protocol conversion capability, support for faster transmission speeds and perhaps voice.

Equinox Systems, Inc., founded in 1983, has done an impressive job of luring users into its fold, IDC said. The company’s products boast a wide range of features and functions, such as support for a number of wiring options, extensive diagnostics and a free 30-day trial system.

See **Digital** page 20

DATA DIALOGUE

GERALD P. RYAN

Catching up to the leaders: Will IBM be the net management maven?

The consensus is that telecommunications managers have the toughest jobs around. They often find themselves understaffed, under-budgeted and misunderstood. One of their most difficult tasks is predicting industry trends and shaping purchases so they will be in concert with those trends.

One of the most difficult areas to fathom is network management, especially for a complex, multivendor network. Managers are confronted with a broad range of product offerings.

Companies such as Paradyne Corp., Racal-Milgo, Inc. and Codex Corp. supply products that monitor data circuits and gauge performance. These products enable a user to pinpoint problems and take immediate corrective action. Tesdata Systems, Inc., Avant-Garde Computing, Inc. and other vendors offer products that monitor network performance characteristics.

Some companies offer software and hardware solutions

to oversee private branch exchange networks, broadband networks and various digital offerings. There are electronic matrix switches that supply corrective action capabilities, inventory and change management systems and a variety of protocol and link analyzers from a host of companies.

All these companies address relatively narrow parts of the overall network management dilemma, and all are looking to expand their piece of the market by offering broader and more versatile services. They realize there is a great need and a lucrative market for network management systems that can control a complete network.

Historically, IBM has played catch-up with companies like Codex and Paradyne. IBM’s early modems and their accompanying integrated diagnostics were so poorly accepted that the company was labeled as a neophyte in data communications.

IBM’s big edge has been its alliance with the data processing manager. Gradually, the company began to move into the networking performance area with products such as Network Communica-

tions Control Facility (NCCF), Network Problem Determination Application and Network Performance Monitor.

Few people realized IBM was gradually improving and refining its networking technology and software. The company began to recruit and hire many of the people who were cut adrift from AT&T. These people began to shape and define a network strategy for IBM that was more than just peripheral to the sale of computer hardware.

The acquisition of Rolm Corp. and an investment in MCI Communications Corp. sounded a clear signal that IBM planned to carve out a large piece of the network pie.

That movement continued this year when the company announced NetView. Many industry observers knocked NetView because of its apparently glaring first-cut deficiencies and failed to see the broad outlines being defined by IBM.

Let’s set the record straight. IBM intends to make NetView an industry standard as pervasive as Systems Network Architecture. In NetView, the company has combined improved NCCF

See **Management** page 20

Ryan is president of Connections Telecommunications, Inc., a consulting and software firm in West Bridgewater, Mass.

Digital from page 19

Another contributing growth factor will be the use of small data PBXs in cooperation with local-area networks. A data private branch exchange could supply multiplexing and server functions on a local-area network.

A few data PBX vendors have started to work on this integration by purchasing local-area network vendor companies.

Micom Systems, Inc. purchased Interlan, Inc., and Infotron Systems Corp. has purchased Applitek Corp.

The high end of the data PBX market is becoming saturated as other technologies, such as broadband local-area networks and voice and data private branch ex-

changes, increase in use. In response to market saturation, vendors will try to attract mid-range and small system users.

Matrix switches are microprocessor-controlled restoral devices operated by technicians at a central site. These switches continually monitor the status of central site equipment, generate alarms upon network or device failure and dynamically switch in backup lines or equipment. Typically, they are found in large, synchronous environments.

Most matrix switches support 400 to 600 ports at an average cost of \$300 per port.

The matrix switch market grew at a healthy rate of 54% domestically and 100% internationally in

1985.

Products brought to market last year demonstrated that vendors are anticipating users' future needs. Almost all of the new switches support V.35 interfaces, and a number have added T-1 capabilities.

Also, network management capabilities are being added to a number of products. The products include polling, alarming, statistical information and sparing. In the short term, these features will add to the price of a switch.

IDC predicted an annual compound growth rate of 26% and revenue of \$204.9 million by 1990.

IDC's report is available for \$1,000 from Dorothy Ferriter at IDC, (617) 872-8200. ☐

Management from page 19

capabilities with control of Rolm PBXs and the company's Token-Ring Network. In addition, Timeplex, Inc., Teleprocessing Products, Inc., Doelz Networks, Inc. and four other companies announced products compatible with NetView.

Will IBM succeed in establishing NetView as a de facto standard? Will vendors such as AT&T and Codex simply acquiesce to NetView's dominance?

Traditional telecommunications industry leaders have a technical head start and a more focused view of telecommunications needs. These companies have a broad, entrenched customer base, and they plan to keep it. Their chief weakness continues to be the lack of an integrated system that addresses a complete corporate network.

Systems integrators who use telecommunications products are emerging to overcome this weakness. Companies like McDonnell-Douglas Corp., Contel Corp. and Boeing Computer Services Co. are providing turnkey amalgams customized to the needs of the client.

SMALL TALK

There's been a lot of small talk about data switches lately. But one fact remains . . . if you have a *small* group of workstations that need to *talk* . . . Gandalf has the answer.

Gandalf's new PACX 200 desktop data switch allows workstations like terminals and personal computers to communicate with each other or with attached office resources like minicomputers. By maximizing the use of your expensive computer equipment, the PACX 200 minimizes your communications line costs and reduces the need to add computer resources as your company grows. PACX 200 offers:

- Versatility that allows you to use products from different vendors
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In addition, PACX 200 has the highest performance at the lowest cost per connection of any small switch on the market.

So, if you want small talk, talk to the competition. But if you have small groups of people who need to share information, talk to Gandalf. (312) 541-6060

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*“Take time to
think through
your
company's
strategic
needs.”*

New players are also to emerge. One venture-backed group has put together a start-up kitty of about \$50 million to provide comprehensive network management solutions. They'll start as integrators of existing technologies and quickly develop overall unifying hardware and software systems to tie all the items on a network into one system.

Don't forget the regional Bell operating companies. Not only are they network providers, but they have a tradition of overall network support. As soon as the courts unshackle the RBOCs, expect to see them as significant players.

So what should a network manager do? First, don't make any expensive, long-range decisions now. If the network manager can hold off until the dust settles, options will be broader and trends will be more clearly defined.

Second, take time to think through the company's strategic needs. Prepare some position papers and circulate them through the management ranks so the company can develop a set of systematic goals for the corporate network.

Third, if faced with an immediate need to improve your network management systems, don't succumb to the temptation to take a large bite of the network management pie. Instead, select a few mainstream products. They are likely to be part of any direction the industry may take. ☐

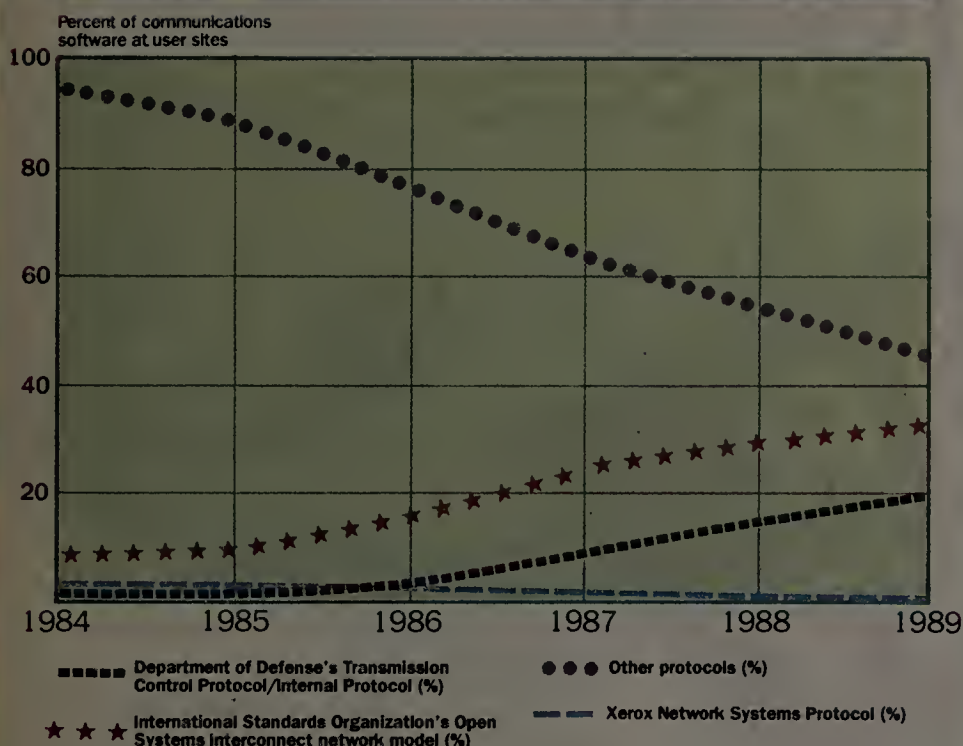
LOCAL NETWORKING

“We are long past the stage of local network arm-waving technology. Today, the issue is not who can make it work; it is who can make it work for X number of years. The marketplace is going to move increasingly toward those vendors that can provide solid service and support capabilities.”

Terence Bentley

Director of communications research
The Yankee Group
Boston

Acceptance of network protocols



Use of the Xerox Network Systems protocol and nonstandard communications protocols will decline as protocols compatible with the International Standards Organization specifications and the Department of Defense's Transmission Protocol/Internet Protocol rise.

SOURCE: THE YANKEE GROUP, BOSTON

LOCALNET '86

Semi makers cut chip deals

BY MARY PETROSKY

West Coast Correspondent

SAN FRANCISCO — Semiconductor vendors Texas Instruments, Inc. and National Semiconductor Corp. rolled out announcements at the Localnet '86 show held here recently, TI stating it will support IEEE 802.2 logical link control (LLC) in its token-ring chip set, and National Semiconductor announcing the compatibility of its Ethernet controller with Novell, Inc.'s Advanced NetWare operating system.

National and 3Com Corp. also announced a strategic partnership, along with the first byproducts of that relationship — a tool kit designed to help computer manufacturers develop 3Com-compatible networking products.

TI made its announcement jointly with Sytek, Inc., which is providing 802.2 source code for the chip maker's TMS380 Token-Ring chip-set. TI developed the TMS380 chip-set jointly with IBM. The 802.2 LLC is the layer above the media access control defined by IEEE 802.5 and has been selected by IBM.

Sytek's implementation of 802.2 supports IBM's Advanced Program-to-Program Communications/Personal Computer and Network Basic I/O System interfaces, which are required for peer-to-peer communications between personal computers on an IBM network and for mi-

cro-to-mainframe connections. Sytek has said its code can be supported on a range of media, including broadband coaxial cable, baseband Ethernet-type coaxial cable, unshielded twisted-pair, fiber-optic and IBM Token-Ring media.

The TMS380 with 802.2 on-chip, slated for delivery in March 1987, will improve network performance and, through simplified system integration, cut the cost of developing token-ring products, according to TI. System performance could improve by as much as 50% because on-board LLC protocols will free network workstations from operations such as sequencing, acknowledgments, link sessions control and automatic retries.

By announcing compatibility between its DP8390 Network Interface Controller (NIC) and Novell's Advanced NetWare, National is making it clear to OEMs they can design networks using Novell's development kit with National Semiconductor's NIC. The DP8390 implements all media access control layer functions in accordance with the IEEE 802.3 standard.

In addition, National Semiconductor will make available in the first quarter of 1987 a tool kit containing National's DP389EB LAN evaluation board and 3Com's 3+ network software and documentation. This tool kit is aimed at OEMs looking to develop 3Com-compatible network products. □

SOFTWARE OPTIONS

Virtual Ethernet circuits

OXNARD, Calif. — Network Research Corp. (NRC) announced a new option for its Fusion Network Software (FNS) here last week that is compatible with products from Bridge Communications, Inc. and, when used with Bridge servers, enables RS-232 devices to communicate at high speed over Ethernet virtual circuits.

Terminals, printers and other nonprocessing RS-232 devices connected to FNS-compatible Bridge servers — including the CS/1, CS/100, CS/200 and LS/1 — can communicate with hosts outfitted with the FNS software option over virtual circuits at speeds up to 750K bit/sec. Standard RS-232 interfaces are typically limited to 19.2K bit/sec.

The software option supports the Department of Defense's Transmission Control Protocol/Internet Protocol (TCP/IP) and the Xerox Network Systems (XNS) protocol.

Bridge servers supporting XNS can establish a virtual terminal connection to any machine on the FNS network using standard Bridge utilities and commands. FNS hosts can also establish virtual circuits to any Bridge port with NRC's "bcon" utility.

TCP/IP Bridge servers can use any machine on the FNS network to perform terminal sessions to a Bridge device or connect from a Bridge device to an FNS host using the Telnet protocol.

The FNS Bridge Compatibility software option is available now from NRC for a range of operating system environments, including Unix, MS-DOS and Digital Equipment Corp.'s VMS. The option costs as little as \$100 for personal computers, NRC reported. The option has reportedly been successfully installed and used by a major government agency, which is said to be connecting a large number of personal and minicomputers to printer and terminal devices. □

LANMARKS

JOHN DIX

Twisted-pair scores high points

Despite the fact local network procurement decisions have supposedly risen above early concerns about things like access methods, the issue of wire continues to be a problem.

Options abound: fat Ethernet-type baseband coaxial cable, central antenna television broadband coaxial cable, thin coaxial cable, shielded telephone-type twisted-pair wire, standard twisted-pair wire, flat under-carpet cable and fiber-optic cable.

Choosing the proper media re-

quires consideration of present and future bandwidth requirements, expandability of network access points, ease of installation and movement of network devices, and installation cost and ongoing maintenance.

Nonshielded twisted-pair wire is gaining acceptance as the network medium of choice. The telephone-type wire is the easiest to install, cheapest and, when wired in traditional telephone fashion, easy to manage.

Although it is possible to use

existing telephone wire for network support, lack of documentation and careless installation typically render most existing wire useless.

IBM's endorsement of twisted-pair wire, however, will virtually ensure a migration to the latter, leaving in question the future of coaxial systems. In the future, local networks will probably employ coaxial cable and fiber optics to support twisted-pair star clusters or where special high-speed connections are required.

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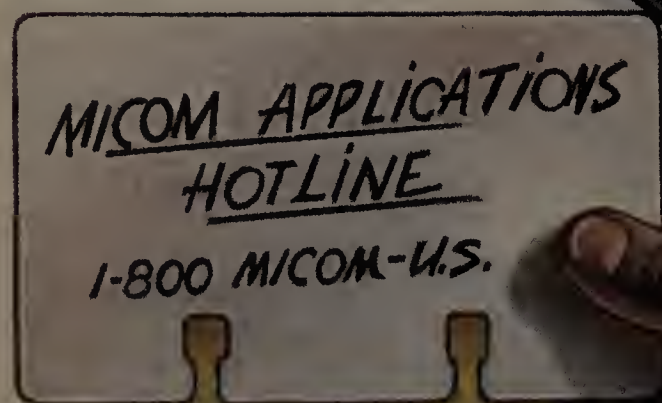
There are also easy-to-use menus to guide new users through the system. Plus, you won't need to run bulky lengths of cable between the Series 20 and individual devices, like terminals and printers. Our Data Distributor can be conveniently located near your equipment, using only two existing wire pairs. This makes for fast terminal connections and eliminates cumbersome RS-232 cable.

What's more, the Series 20's small size fits into your office as comfortably as its low price fits your budget.

To find out how easy it is to rent and install an INSTANET6000 Series 20 data PABX, call us at the MICOM applications hotline.

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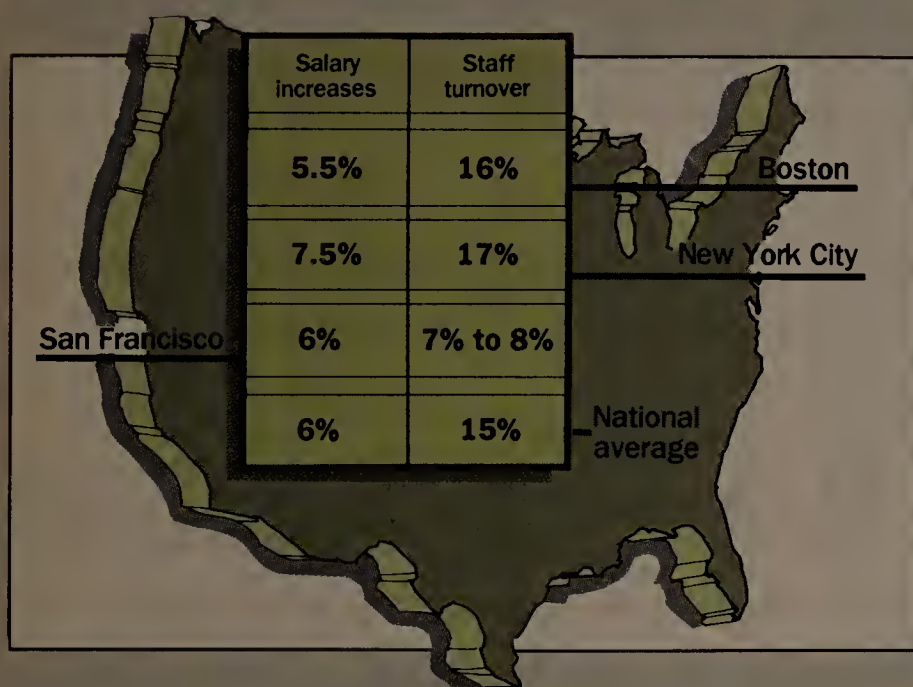
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“Are you more comfortable talking about equipment with other telecommunications managers or consultants? If you said managers, you’ve got lots of company. A Pacific Bell survey found the single most important source of information about equipment and services is business associates (88%). That’s a good reason to join a users group.

Telecom Executives Handbook
Published by United Communications Group
Bethesda, Md.

Data processing salary/ turnover outlook for 1987



SOURCE: EDWARD PERLIN ASSOCIATES, INC., NEW YORK

GUIDELINES

JOHN GALLANT

ISDN becomes a reality

With a telephone call from Mountain Bell's Arizona vice-president and chief executive officer Don Cline, the first actual user test of Integrated Services Digital Network got under way last month. Now it seems users will finally be able to put ISDN into perspective.

No, ISDN won't make local networks obsolete, obviate the need for private lines or change the telecommunications landscape overnight. It's a framework designed to integrate voice and data transmissions and support advanced services. And, yes, it will eventually change the nature of telecommunications as we know it.

Large business customers will be able to derive 23 channels from a single twisted-pair telephone wire that can simultaneously support a range of services and reconfigure the service mix at a moment's notice.

In the morning, the line may be divided into channels providing 12 AT&T Megacom lines and nine AT&T Software-Defined Network links. At night, the user could amalgamate the circuit capacity to provide a few high-speed digital pipes to

Gallant is managing editor of Network World.

dump data to remote locations.

Beyond customer-controlled reconfiguration exists machine-controlled reconfiguration. This environment won't require human intervention. With each call, a customer's switch will inform the network what access channel it wants to use and which service the call is destined for.

That technology is, admittedly, a long way off. The Phoenix trial is just the beginning, a chance to test the nuts and bolts of ISDN Centrex-style. John Amidon, deputy manager of information systems and operations for the Arizona Department of Transportation, the first user company in Mountain Bell's trial, said one benefit he wants to examine is the ability to relocate terminals by simply plugging them into a wall jack.

Sidestepping talk of networks as strategic assets and avoiding the jargon of communications as a competitive weapon, technological advances such as ISDN are really nothing more than ways to support applications.

The Arizona ISDN trial offers users a good opportunity to see some advanced technologies at work. After that, it will be up to the users to decide how ISDN can be employed.

► NETWORK SECURITY

Zale builds a safer system

Firm hires expert to safeguard net.

BY MICHAEL FAHEY
Staff Writer

IRVING, Texas — With 1,500 retail jewelry stores located throughout the nation, Zale Corp. is highly dependent on its data processing and communications network for processing customer credit applications and maintaining store inventories. So dependent, in fact, that the company hired Newton Terry, an expert on network security and disaster recovery, to train its employees on the subject.

Terry joined Zale, based here, in 1984, for what he believed would be a short stint training the company's in-house staff in security procedures and disaster recovery. Now, more than 2½ years later, he is still working for the company, ensuring the physical security of its information processing and communications network.

"Physical security is very important," said Terry, adding that protecting information systems from damage caused by intruders or disgruntled employees, as well as fires, floods and natural disasters, is at least as important as ensuring against technological malfunctions.

For Terry, the author of two books on the subject, disaster recovery preparation is a time-consuming process requiring meticulous planning. Still, he said, disaster recovery procedures can be broken down into three broad categories: prevention of disaster, limiting damage of unpreventable disaster and making sure the network is up and running as soon as possible after a disaster.

"It is much more cost-effective to prevent a disaster than to try to recover after the fact," Terry said.

The initial step in disaster prevention is to perform a risk analysis to identify areas in which the network is vulnerable. This analysis should be periodically updated to include new hardware, software and applications. No risk analysis should be undertaken without consulting the system's users, the expert noted.

"If you cannot prevent a disaster, the next thing to do is limit the extent of damage through operator training and emergency procedures to show employees what to do," he

explained. "Generally, during an emergency, what happens in the first five minutes will determine whether you have a minor accident or a major disaster."

In the case of an actual disaster, the most important task is to get the system up and running as quickly as possible. At Zale, Terry said, there are some 15 recovery teams prepared to go into action after a disaster.

A backup data base is perhaps the most important element in a disaster recovery program, said Terry. "For example, our data base is unique to Zale," he explained. "You can hire extra people to come in and help during an emergency. You can lease or buy equipment, but you cannot do that for files that are unique to the company."

Zale has what Terry described as a "critical data base." That is, the company's emergency data base comprises its most critical information. Terry pointed out that, in an emergency, it is important to have a streamlined disaster recovery program capable of running the most important applications.

Zale's backup facilities are what Terry described as a shell. He explained that a shell is a facility with a raised floor, air conditioning and other requirements needed to house a CPU. A backup facility fully equipped with a CPU and peripherals is called a "hot spot," in disaster recovery parlance.

Backup communications facilities are among the most important and hardest to obtain elements of a disaster recovery setup, Terry said. This is because users generally are dependent upon interexchange and local exchange carriers for emergency telephone lines.

Zale is currently assessing its emergency communications needs. It is likely that the company will opt to back up its private-line service with emergency dial-up capability. He said he has recommended that the company have 100 backup modems, 20 dial-up lines and four dedicated lines ready to press into service in the event of a disaster.

The cost of a disaster recovery plan can range from \$100,000 to \$1,000,000, Terry said, depending on the size of the system and the amount of redundancy. ▀

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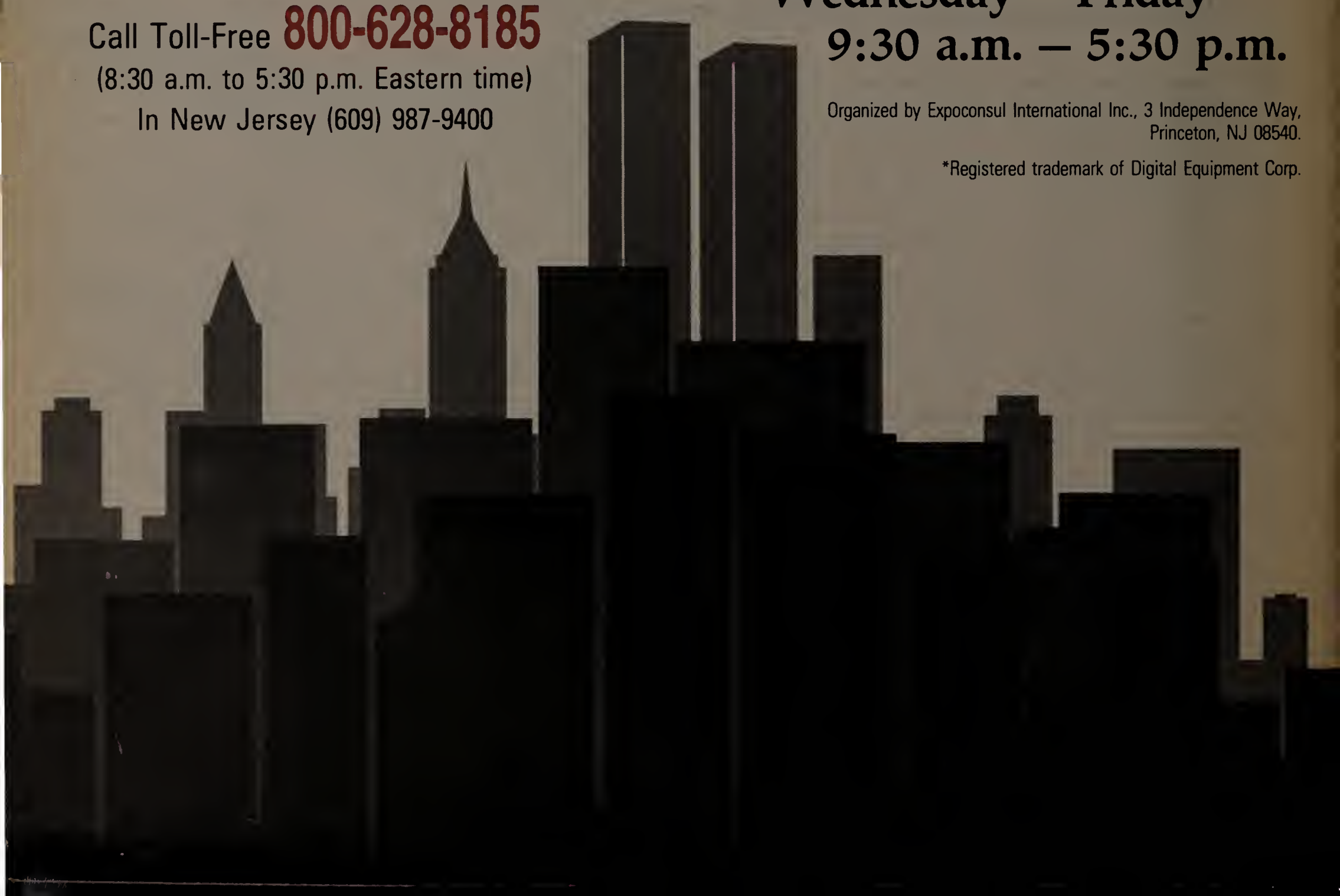
December 17-19, 1986

Wednesday — Friday

9:30 a.m. — 5:30 p.m.

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NEW PRODUCTS AND SERVICES

See inside for:

- Racal-Milgo trellis-coded modem
- Data switching unit and switch control package

► DATATEL, INC.

Data link tester bows

Newest member of analyzer line has T-1 test capabilities.

CHERRY HILL, N.J. — Datatel, Inc. expanded its line of test equipment with a new data link analyzer.

The firm's DCP2083 Data Link Analyzer III, a desktop testing device, is designed to assist network engineers in measuring data link performance, testing the integrity of data once it reaches the transmission line and performing diagnostics on transmission equipment.

The unit creates 10 test patterns in eight different data formats and will test synchronous, asynchronous and T-1 transmission facilities. It can also be used to test modems, multiplex-

ers and the channel service units and data service units used in digital data transmission.

The DCP2083 Data Link Analyzer III is positioned above its DCP2081 Data Link Analyzer, according to the firm. The DCP2081 is used to test the quality of synchronous and asynchronous data links.

The DCP2083 supports five different switch-selectable interfaces, including V.35, RS-232, RS-422, bipolar and the MIL-STD-188 Military Communications System Technical Standard. The unit features 47 switch-selectable operating



DCP2083 Data Link Analyzer III

speeds ranging from 50 bit/sec to 6M bit/sec.

Datatel is touting the device's ability to measure T-1 facilities. The device is equipped with LED indicators that keep operators apprised of when T-1 transmission requirements have not been met. The T-1 testing and LED indicators continue operating even when other test procedures are under way.

Tests are looped through

the system at user-defined intervals. When the results are received back, they are displayed in one of three digital readout screens. The unit also keeps track of seven different error measurements, including bit, character and block errors as well as the number of seconds-in-error, error-free seconds and test seconds.

In addition to its other testing features, the DCP2083 Data Link Analy-

er III includes a loop mode supporting loop-back self tests.

Users can print out test results by attaching a printer to the unit's printer port.

A desktop version of the DCP2083 Data Link Analyzer III is available for \$4,975.

A kit that supports rack-mounting of the unit is priced at \$250, while a portable version is available for \$5,325. □

Products & Services

Facility terminating unit

General DataComm, Inc. recently introduced a telephone company central office facility terminating unit (FTU) that will support hubless, dedicated digital data transmissions. The firm also announced a 2,400 bit/sec modem and an enhancement to its Accunet Terminal Interface Unit.

The **DataComm FTU-56K** is a full-duplex, synchronous data communications unit for use in a telephone central office to establish digital links within a local access and transport area at 56K bit/sec. The unit supports point-to-point or multipoint bridged service applications in place of a digital transmission service or channel bank data point. The product reportedly eliminates the need to link digital transmissions through a hub office. The unit will also support remote test systems including AT&T's Switched Access Remote Test System.

The **Acculine 224X** 2,400 bit/sec modem includes X.25 packet access and error correction. The modem operates synchronously or asynchronously in full-duplex and features autodialing capabilities. The product supports the Hayes Microcomputer Products, Inc.'s AT Command Set and is compatible with

a number of communications software packages.

The **High Density Rackmount** version of the **Digi-Dial/56K** is designed for high-density installations requiring multiple switched 56K bit/sec circuits. Up to 15 Digi-Dial/56K channel cards will fit in GDC's 19-inch rack-mounted shelves. A single push-button telephone or 801-type automatic calling unit will allow all 15 channel cards to access AT&T's Accunet network.

The FTU-56K costs \$995. The Acculine 224X costs \$770. The Digi-Dial/56K Rackmount cards cost \$2,250, and the telephone interface card set is \$795.

General DataComm, Inc., Middlebury, Conn. 06762 (203) 574-1118.

Network equipment line upgraded

Xyplex, Inc. has added network management capabilities and a device that acts as a gateway between two types of media to its networking equipment line.

Xyplex's product line is designed to cut network costs for users of Digital Equipment Corp.'s Decnet. The company's Distributed Network Processing System connects DEC VAXs, ASCII de-

See Xyplex page 28

► UNGERMANN-BASS, INC.

Remote LAN link works via T-1 lines

SANTA CLARA, Calif. — Ungermann-Bass, Inc. recently introduced a network interface unit that links remote computers attached to its Net/One local-area network over a T-1 line.

The **Network Interface Unit-140 (NIU-140)** is teamed with a pair of Ungermann-Bass's High Speed Remote Bridges to support synchronous transmission over a T-1 link, the firm said. The firm's High Speed Remote Bridge reportedly supports the T-1 speed of 1.544M bit/sec.

In addition to linking remote synchronous computers over a T-1 link, the NIU-140 enables a pair of synchronous devices attached to the same network to communicate in a point-to-point environment.

Each NIU-140 supports a pair of synchronous point-to-point RS-232 connections running at speeds of 19.2K bit/sec.

The NIU-140 supports IBM's Systems Network Architecture's Synchronous Data Link Control (SDLC) protocol, Digital Equipment Corp.'s Digital Communications Message Protocol, the International Standards Organization-favored High-Level Data Link Control as well as IBM's EBCDIC and Binary Synchronous Communications (BSC).

According to the firm, the device will link an IBM mainframe to a 3274 cluster controller using SDLC or BSC protocols over T-1 lines. In that configuration, the firm said, the NIU-140 is used to connect the mainframe's front-end processor and the cluster controller to Net/One.

Available later this year, an NIU-140 model operating on baseband networks costs \$2,595, and a model operating on broadband networks will be priced at \$2,995. □

ON AT&T'S "HIGHWAY 3B" THERE ARE NO LIMITS ON WHERE YOU CAN GO WITH COMPUTERS.

Like it or not, the multi-system environment is here to stay. Mainframes will be mainframes. PCs will continue to proliferate like mosquitoes. And user needs will change every day.

It is high time somebody created a family of computers for an evolving mixed-system environment. The time is now. The "somebody" is AT&T.

Our 3B computer family is among the first to blend the technologies of data processing and communications. Result: a unique ability to distribute processing

power across system lines, from user to user, desktop to department, and department to mainframe.

AT&T's 3Bs are easily linked *up* to IBM* mainframes and *down* to any combination of terminals, peripherals, and MS-DOS** PCs. The idea is to open communication between



COMPUTERS WITH THE FUTURE BUILT IN


3B2/310. Supports up to 14 users, 18 RS232C ports. Speed: 1.1 MIPS, 32 bits at a time. *All 3Bs are 32-bit machines.* Storage: 86MB internal hard disk; up to 516MB with Expansion Modules.

3B2/400. Supports 10 to 25 users, 46 RS232C ports. Speed: 1.1 MIPS. Storage: 172MB internal, to 860MB with Expansion Modules.

3B2 XM. Expansion Module adds 23MB cartridge tape storage and/or 30 to 72MB hard disk storage.

3B15. Serves 16 to 60 users, 128 RS232C ports. Speed: 1.6 MIPS. Supports 8 drives, with maximum storage of 2.7 gigabytes.

Not shown: Other members of AT&T's 3B computer family serve up to 100 users, across a wide range of business needs and environmental conditions.



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systems—without forcing users to give up the applications they know and trust.

In most offices, the effect on productivity is electric.

"THESE GUYS THINK OF EVERYTHING."

The 3B's role in a distributed data processing environment can grow and change as your business evolves. For starters, UNIX™ System V permits the same software to run on a variety of machines, protecting your investment in applications and user training.

On the hardware side, the whole 3B family is like a big set of building blocks. Everything is modular. A system of feature cards and interfaces makes it easy to add functions or peripherals. Or add users. Or boost performance. Or all of the above—in any order, at your own pace.

Example: A 3B "starter" system that is cost-efficient for 6 users can easily grow to serve 60 users—and more—with the same efficiency. By networking 3B to 3B you can support *thousands* of users—like adding beads to a string.

Whether those "beads" are down the hall or an ocean away, AT&T's networking tools can swiftly unite them all into a single, flexible, responsive system.

WHERE ARE YOU GOING?

AT&T's 3B family was created *as a family* to enhance the systems you have today, without imposing limits on where you can go tomorrow.

You can start with the pieces you need to solve today's problem: linking mainframe and desktop, say; or pulling together a department. As your needs and ambitions change, so can your system. AT&T makes the pieces fit.

To learn how much we can do for your company today, and how far we can take you tomorrow, please contact your AT&T Account Executive, authorized supplier, or telephone 1 800 247-1212.

*IBM is a registered trademark of International Business Machines Corp.
**MS-DOS is a trademark of Microsoft Corporation.



AT&T

The right choice.

Products & Services

Xyplex from page 25

vices and IBM mainframes.

The network management system is part of the new Release 2.0 of the company's operating software and is being offered free to current users. The software costs \$2,500 for first-time users. The operating system runs on a VAX with VMS operating system 4.4.

With the software, a network manager can perform real-time monitoring of network performance. The product supplies statistics for cable utilization, message transaction rates and other performance parameters. The status of network components can be monitored down to the port level.

Modem control signal status displays enable a system manager to determine whether or not a physical link between devices has occurred. Load balancing options are displayed, and a user-originated load balancing algorithm can be easily changed to maximize VAX processor performance.

The software is menu-driven. Each menu accepts form commands that allow a manager to point to a command and strike return to execute it. Commands include View Information, Update Configuration, Disconnect Port, Connections Restrict and Parameter Load.

The microprocessor-based Xyplex Ethernet/Linear Coaxial Interconnect ties an Ethernet link to a Linear Coaxial, which Xyplex has used for its systems. The link costs \$3,000.

Xyplex, Inc., 100 Domino Drive, Concord, Mass. 01742 (617) 371-1400.

Trellis-coded modem introduced

Racal-Milgo, Inc. recently introduced a trellis-coded modem operating in full-duplex over dial-up or leased lines at speeds of 4.8K bit/sec or 9.6K bit/sec.

The synchronous **RM-9632** modem complies with CCITT V.32 recommendations over 2-wire dial and 2- or 4-wire leased lines. The modem's 2.2 second echo cancellation allows its use with satellite links. Use of trellis-coded modulation, in which redundant data packets are sent, reportedly results in fewer data retransmissions.

The RM-9632 features an auto-dialer capable of storing up to 10 telephone numbers in nonvolatile memory. All configuration parameters are also stored in nonvolatile memory. The modem also offers manual or autoanswer along with a test pattern generator, error detector and loop-back features for self-test and diagnostics.

Two interfaces are supported by the RM-9632. The RS-366/V.25 parallel dial interface is compatible with RS-366-based autodial connections. The serial asynchronous dial interface provides autodial functions over an RS-232-C port.

The RM-9632 is priced at \$3,500.

Racal-Milgo, Inc., 1601 N. Harri-

son Pkwy., Sunrise, Fla. 33323 (305) 475-1601.

Data switching unit, control package out

Dynatech Data Systems Co. recently introduced a data switching unit, a switch control package, a V.35 A/B electromechanical switch reportedly operating at speeds of 1.5M bit/sec and a twisted-pair wired multiplexer.

The **EasyNet** switching system reportedly links terminals, hosts, printers and modems at speeds up

to 19.2K bit/sec. A data rate conversion buffer allows a device to communicate at its fastest speed to any peripheral device.

EasyNet offers toggling between connections, redundant logic and power, and password security, Dynatech said. The system's menu-driven configuration package can be accessed from any attached terminal. The base unit comes with six ports and can be expanded to support 1,536 ports. The 6-port unit is \$2,500. A fully configured unit is about \$125,000.

The **DynaNet 150** switch control software gives an IBM Personal

Computer XT or compatible switch control functions. This package can control local or remote Dynatech electromechanical switches, A/B switches, channel or voice access switches and equipment substitution switches.

Software to control all switching functions is priced at \$1,250. A package that supports access to lines being switched for real-time protocol monitoring, alarm status and interface monitoring is priced at under \$10,000.

The **V.35 A/B** electromechanical switch comes in 8- or 16-channel models designed to operate at

What does
N.E.T. offer
that's even better
than proven
leadership in
private
networks?

Products & Services

speeds up to 1.5M bit/sec as well as standard V.35 speeds of 56K bit/sec, according to Dynatech. The eight-channel V.35 A/B switch costs \$6,350. The 16-channel unit is \$12,400. The switches may be expanded in 8- or 16-channel increments up to 64 channels.

Dynatech's 8- and 16-port **Easy-Link** multiplexers can transmit synchronous or asynchronous data up to 5,000 feet over twisted-pair cable. They offer autoreverse on the composite lines and support RJ-11 or RS-232 connectors.

The 8-port EasyLink is priced at \$1,095. The 16-port version is

\$1,895.

Dynatech Data Systems Co., 7644 Dynatech Court, Springfield, Va. 22153 (800) 368-2210.

Two multiplexer boards unveiled

Equinox Systems, Inc. recently unveiled a pair of multiplexer boards that fit its DS-5 and DS-15 data switches and an 8-line board that adds synchronous communications to the DS-5 or DS-15.

The **Inter-Switch Multiplexer** boards are used to create a campus

network by connecting several data switches located in various buildings or by connecting remote data switches over T-1 lines. Connection of data switches in campus networks can be done over 4-wire twisted-pair cable or line-of-sight microwave systems.

Both Inter-Switch Multiplexers are plug-in boards. A version for use with U.S. T-1 circuits provides 144 connections between data switches at speeds of 1.544M bit/sec. A version for use on European T-1 circuits meets the G703 specification and operates at 2.048M bit/sec to provide 180 connections be-

tween data switches.

The **8-Line-SYNC Board** allows the DS-5 and DS-15 to be used for network configuration and for fall-back switching to back up computers and data communications equipment in IBM, Burroughs Corp. and other synchronous mainframe environments.

The firm said the board offers an alternative to the patch panels and electronic matrix switches commonly used in synchronous environments.

As with electronic matrix switches, synchronous connections to the data switch are created with the data switch's supervisor terminal and are maintained in nonvolatile memory. Point-to-point and multidrop configurations are supported by the board.

Each 8-Line-SYNC Board supports eight synchronous RS-232 lines with full-modem control signals operating at speeds of 9.6 bit/sec.

Both versions of the Inter-Switch Multiplexer board cost \$5,000. The 8-Line-SYNC Board is priced at \$2,000.

Equinox Systems, Inc., 12041 S.W. 144 St., Miami, Fla. 33186 (305) 255-3500.

Micro-based programmable telephone

Teledex Corp. announced a micro-processor-based programmable telephone supporting single-button access to Centrex and private branch exchange features.

According to the company, the **Basic+** telephone includes a message-waiting light and 11 programmable keys capable of storing up to 15 digits and characters, including pause and flash commands.

The programmable telephone keys can be used for autodialing and other functions such as remote pickup, automatic redialing, call transfer and call forwarding.

The Basic+ is available in tabletop or wall-mounted versions.

The Basic+ telephone costs \$95. *Teledex Corp., Suite 200, 25 E. Trimble Road, San Jose, Calif. 95131 (408) 942-3100.*

Autodial modem fits in Meridian PBX modem pool

Bizcomp Corp. announced an autodial modem designed for use in modem pools attached to Northern Telecom, Inc.'s Meridian private branch exchanges.

The \$549 **4120-NT** is reportedly compatible with the Hayes Microcomputer Products, Inc. Smartmodem AT command set. Its internal software supports user-defined call setup, call progress, automatic logon and call termination parameters. It also supports other communications software and will operate as a stand alone.

Bizcomp Corp., 532 Mercury Drive, Sunnyvale, Calif. 94086 (408) 733-7800.

Proven success.

After all, *success* is what you're after.

And since a private corporate network is no small investment, you'll want to look carefully before you leap.

You'll want to be sure your investment yields substantially improved information control and uptime performance. And, since profitability is the bottom line, you'll want to be sure you achieve rapid payback.

N.E.T. is in the business of success.

We realized from the start that our destiny, and the destinies of our customers, were one and the same.

That's why we set out to give our customers the capability, the compatibility and the reliability they need to stay ahead of *their* competition. That's why we set out to offer the most flexible architecture on the market, to fit each company's individual requirements and future needs.

Equally important, N.E.T. saw service as integral to customer success. That's why N.E.T. puts more emphasis, including more investment, in customer service.

The success of our customers is the best advertisement we could ask for. Take, for instance, the customer who told *Network World* that his N.E.T. T1 network system was "the most reliable piece of communications

equipment" his company had ever owned.

If you're out to shape and control your company's telecommunications and data destiny (and costs), then N.E.T. invites you to look, listen, and compare.

We certainly aren't the only company that promises you consolidated voice and data traffic in a manageable, *reliable* communications system. But we may be the only one that can prove it.

Here's what puts N.E.T. customers ahead:

Performance. Your business functions more effectively. N.E.T. significantly increases the operational performance of your communications—data, voice and video.

Compatibility. With existing communications standards. With *emerging* communication standards. And with all the major T1 common carriers.

Reliability. N.E.T.'s designed-in nonstop redundancy and an intelligent, self-healing architecture assure you that your critical applications have higher availability—the true measure of reliability.

Service. From network planning and design to our 24-hour-a-day, seven-day-a-week Technical Assistance Center, N.E.T. gives you the total support

that makes building a private corporate network *practical*.

Proven Success. Over thirty major U.S. companies and institutions are now reaping the benefits of installed N.E.T. networks.

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In California: 1-800-227-5445,
Ask for dept N35

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NETWORK
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Opinions

INTERACTIVE VOICE

C. WILLIAM REED

No operators need apply

A customer calls a vendor's 800 number. But instead of hearing a live operator, he hears a pleasant voice ask him to press "one" if he would like to place an order, "two" if he would like to receive more information on the product, or "zero" if he needs to speak to a human operator. Using the push-button keypad to enter the data, the customer can receive instant credit authorization, leave a voice message requesting more specific information or have the product shipped immediately to the address listed on his credit card.

This scenario is just one application in the rapidly expanding market for interactive voice equipment and services.

The interactive voice market encompasses any equipment or service that makes interaction possible between a push-button telephone, a communications network and a computer or tape system.

Voice messaging is by far the most familiar interactive voice service. It has received the most attention from the trade press, and rightly so, since it constitutes the largest revenue producer for the industry. Everyone is familiar with telephone answering machines, and although voice-messaging equipment is much more sophisticated, functional and expensive than answering machines, it nevertheless fulfills a similar need.

In addition to voice messaging, however,

Reed is director of research services at Link Resources, which is a New York-based market research and consulting firm specializing in information and communication services.

the interactive voice industry provides a range of products and services that make it easier for customers to communicate with businesses and for businesses to coordinate internal communications. There are four other primary applications that interactive voice equipment can support:

■ **Audiotex.** This application is dedicated to the one-way dissemination of information or entertainment. A company sets up a number of recorded messages that customers can call to find out about products, to learn where a service representative may be found or to hear an entertaining message. The Bell operating companies' 976 Dial-It services, which allow customers to call for recorded weather information, horoscopes or other information for a fixed fee, are a good example of a publicly available audiotex service. Both private and corporate uses of audiotex are growing rapidly.

■ **Transactions.** Along with voice messaging, this is the fastest growing interactive voice application. In transaction applications, interactive voice hardware turns a push-button telephone into a data entry terminal. A bank customer, for example, can call in and transfer money from one account to another or hear a recorded voice read off his account balance. The bank does not need a live operator to complete the transaction, and the customer does not have to stand in line or buy an expensive data terminal.

Within a company, salespeople can call a single number and enter a variety of information without being put on hold by the operator. This information might include the cus-

tomers' order number, items ordered, amount and where they should be shipped.

■ **Call handling or auto-operator.** This application replaces a live operator in a situation where most callers ask the same question. The caller hears a recorded voice that directs him to the proper area within the company. In some cases, the number of calls going through the operator is reduced by as much as 80%.

■ **Polling/surveying (telemarketing).** These devices not only dial hundreds of numbers a day, but they also deliver a recorded message, if the call recipient requests it, and permit the recipient to leave a response. Catalog operations like Sears, Roebuck and Co. are using interactive voice equipment to notify their customers that their orders are in; schools use them to notify parents when their children are not in school.

Competition in all four of these categories is heating up. Indeed, interactive voice services and equipment are much less expensive than they were two years ago. In addition, many vendors' markets are beginning to overlap. As competition intensifies, prices for interactive voice applications will continue to drop.

A shakeout in the market for interactive voice equipment is inevitable.

Already a \$500 million industry, the interactive voice equipment market will grow to nearly \$2 billion by 1991, but the number of players will dwindle from the current 500 to perhaps 150. It is unclear at this point which vendors' technology will survive. This is a

See Voice page 45

TELECOMMUNICATIONS COSTS

LLOYD M. NIRENBERG

The power of price

Are prices of telecommunications products and services too low? Surprisingly, the answer may well be yes.

The current industrywide price levels may be too low for vendors to profitably keep the promises they make to their customers. As customers continue their price pressure on vendors, spurred on by previous broken promises, and as vendors choose to compete more intensely on price, the current state of customer dissatisfaction will persist. This frustrating industry condition can be traced to a fundamental blind spot: the easy pursuit of efficiency rather than the more difficult pursuit of effectiveness.

Consider the information sup-

Nirenberg is president of Competition Technology Co., a Los Gatos, Calif.-based consulting firm specializing in the competitive use of technology, and has 20 years of experience in the communications industry.

plied in the International Communications Association's 1985 Telecommunications Expense Survey. Twenty-three major industries are ranked according to their telecommunications expenses as a percent of 1985 total revenues and total operating expenses. The average across-industry telecommunications expense is about .60% of revenue. The study also shows that average telecommunications costs are only .83% of total operating expenses. Even a doubling of network costs will not make much overall difference in total operating costs. Hence, user efforts to reduce telecommunications prices further, while efficient, will hardly be effective at the bottom line.

Currently, data processing, MIS and telecommunications managers work within the competitive request for information (RFI)/request for proposal (RFP) structure to get the best deal for their firms. However, these managers obtain immediate praise when vendor

prices are squeezed lower up front, while the proposed benefits of good vendor performance are some time away. Vendors, succumbing to up-front price pressure to get the deal, tend to underestimate the difficulty of delivering when margins are too thin. Their internal cost avoidance mechanisms can become relentless. To break this cycle, procurement methods must change.

Users must be prepared to accept an increase in their telecommunications expenses to provide for more rigorous planning and management of their procurement process. Such an expense increase could be applied in three main areas.

First, although it is currently an industry cliché, tough-minded strategic planning should be conducted. In particular, the user firm should be clear about how its ability to compete in its industry sector would be enhanced by the telecommunications network. Such clarity about competitive benefits gives a framework for the RFP.

The second aspect of procurement that could benefit from more management attention is simply technical competence in network engineering and operations. This competence, whether attained permanently by employees or temporarily by consultants, should be targeted to produce an effective RFP.

An effective RFP successfully elicits vendor proposals that describe networks that will support the firms' goals. Depending on the

Communications users, it's your time to be heard. *Network World* is soliciting guest columns for its Opinions page. Manuscripts must be letter-quality, double-spaced and approximately 800 words in length.

Disk and modem submissions are preferred. Columns should be timely, controversial, literate and technically accurate. Contact Steve Moore, features editor, *Network World*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701, or call (617) 879-0700, ext. 584.

Opinions

► TELETOONS — By Phil Frank

Well then... How about
some good **used**
communications
equipment?



network's size, complexity and the technology involved, the user's technical skills may also be needed to model and simulate the networks proposed to ensure that performance specifications are both reasonable and achievable within the cost constraints.

Finally, a major improvement in user satisfaction can be obtained through pay-for-performance contracts. Users should contractually bind their vendors to specific, measurable goals for quality, reliability, technical performance and delivery commitments. These goals must be tied to payments so contractual satisfaction by the vendor reaps a payment and failure to meet the contract results in a penalty. Such a rigorous arrangement will burden both sides. Users will be required to be clear up front about their strategic and technical goals. Vendors will perceive a greater risk with the introduction of penalties and demand higher prices. The threat of penalties, however, will be a strong inducement for vendors to consider carefully what they can deliver, and higher prices will give them some maneuvering margin. Such a con-

tractual arrangement should result in more customer satisfaction and vendor competition on the basis of value instead of vaporware.

While there is no assurance that higher prices will result in better vendor products, there are indications that this can be true. In the case of complex network systems, the vendor's cost for detailed planning, configuration, staging, delivery, installation and acceptance testing usually amounts to about 25% of the total network price. If vendors raise prices by 50%, it would have little impact in terms of the user company's total operating costs (average telecommunications costs would go up from .83% to 1.25% of total operating expenses) but potentially would have a major impact on vendor performance if the contractual arrangements outlined above are adopted.

This process — in which buyers tightly couple strategic planning and increased user competence and in which users pay vendors for kept promises and receive payment for broken promises — will increase the probability of customer satisfaction, product/service quality and vendor profit margins. ■

MICRO COMMUNICATIONS

KEN KRECHMER

Out with old, in with new?

It seems the emergence of Intel Corp.'s 80386 microprocessor as the core of the next-generation personal computer awaits only the completion of the next MS/DOS operating system and an obligatory IBM announcement.

But how will communications-oriented applications such as electronic mail, network servers and electronic data interchange operate on a future IBM 80386-based personal computer?

Personal computer users, whose communications equipment currently connects to the personal computer via the Read-Only Memory Basic I/O System (ROM BIOS) interface, may soon find IBM raising the stakes of the connectivity game by offering an 80386 version of its Advanced Program-to-Program Communications (APPC) for the personal computer. Such interfaces will give personal computer users the functionality of Systems Network Architecture communications but will require purchasing new computers and software.

Luckily, users and vendors will still have a low-stakes option available, an option that is provided by IBM.

IBM offers two specific software interfaces for connection to its personal computer microprocessors. One is the MS/DOS operating system and its associated ROM BIOS firmware and, more recently, Network Basic I/O System (NETBIOS), which provides networking capability; the other is APPC/PC. According to IBM, APPC/PC provides SNA APPC for applications programs that perform distributed transaction processing. IBM's support of APPC/PC reflects its interest in providing a standard means to allow distributed processing and a standard interface to support SNA.

APPC/PC is a software communications interface that provides more sophisticated communications capabilities than the personal computer's ROM BIOS. Via the APPC/PC interface, the following are supported: LU 6.2/Physical Unit 2.1 peer-to-peer communications, lower level IBM network management functions, conversation and session level

security, and a range of other communications capabilities. The problem with the APPC/PC interface is it monopolizes the personal computer's CPU.

Currently, most communications applications interface with the host personal computer via ROM BIOS or NETBIOS. This is probably due to the complexity of writing communications applications in an SNA environment, the problem of monopolizing the host personal computer for a single communications function and the newness of APPC/PC itself.

When IBM delivers a personal computer based on the 80386, it seems likely that such a system will support APPC/PC as its primary communications interface. The 80386, with its more complex interrupt structure, is a faster and more powerful chip that will be able to handle the processing overhead of APPC/PC. This strategy has several advantages for IBM:

- SNA would be supported down to the personal computer level.
- LU 6.2 peer-to-peer communications would operate to the lowest level peer — the personal computer.
- Currently available BIOS interfaces would become obsolete.
- The user would be required to purchase bigger personal computers to support SNA capabilities.

Any migration away from the BIOS as a standard software interface must take place because of a user desire for more features, not because of a change in the BIOS. Any serious change in the BIOS would cause enormous compatibility problems.

The desirability of SNA is well understood by managers who operate large networks (IBM's major market). SNA capabilities, then, are the means that IBM may use to migrate users from the BIOS interface to the APPC/PC interface.

Such a migration would raise the stakes for users, however, since they would have to purchase new 80386-based personal computers, APPC/PC software and related applications software that takes advantage of SNA. But IBM does offer an alternative.

Big Blue is providing higher level communications capabilities to non-80386 personal computers in its recently announced inter-

See APPC/PC page 45

Krechmer is the principal of Action Consulting, a communications consulting firm located in Palo Alto, Calif.

Features

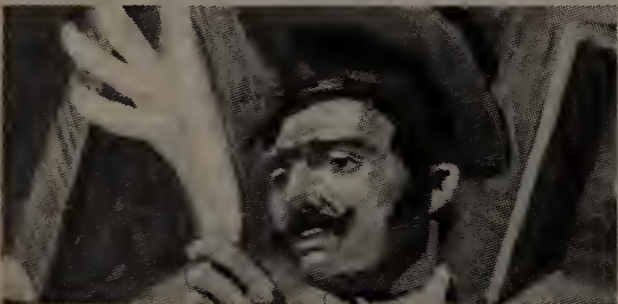
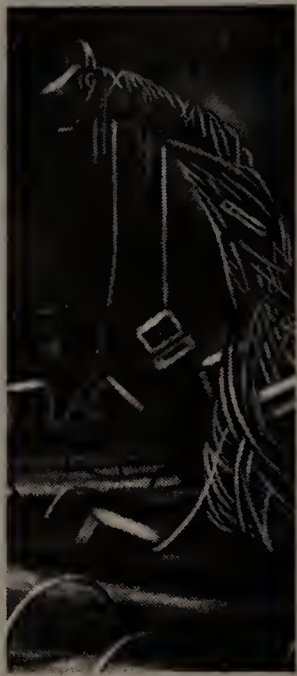
December 1, 1986

Does research soothe the network beast?

Although market research services may help users make informed decisions for even the most Stone Age networks, such services are no panacea for user needs. Here's a look at the big three in the user market, which has evolved from vendor-oriented market research. How do they stack up against user needs?

You decide.

Page one.



Rising to vendor challenges

In the open environment of municipal and nonprofit organizations, responding to a vendor challenge is tantamount to washing your dirty laundry in public. Without careful preparation, such challenges can hurt a communications manager's image — or sink his career.

Page 32.

The consultant's conundrum

When negotiating to hire a consultant, savvy communications managers ask tough questions that identify the consultant's actual or potential biases and conflicts of interest. Part two of this *Network World* investigative report lists specific actions users can take to avoid being steered toward a particular vendor's products for the wrong reasons.

Page 41.



Calling all communications users: What's hot in the industry? Share your knowledge with other users. *Network World* is soliciting feature articles on Digital Equipment Corp. networking issues, microwave transmission and departmental networking.

Send proposals for user-oriented articles on these and other timely communications topics to Steve Moore, features editor, *Network World*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701, or call (617) 879-0700 ext. 584.

MANAGEMENT ISSUES

Rising to ven

In the public sector, a vendor challenge ca

BY PAUL DAUBITZ

Special to Network World

Communications managers in municipal and nonprofit organizations get caught in management snares that their private-sector counterparts seldom encounter. These organizations are often burdened with ancient equipment, high costs and growing pressure to wring the most out of public tax dollars or fund-raising contributions.

In the private sector, decision making is shielded from public view. But the dynamics of project management in a fish bowl — in the glare of public, media and legal scrutiny — are quite different. One of the worst potential pitfalls facing public-sector managers is a formal challenge to their recommendations by a vendor that loses a bid.

Challenges range from relatively minor inconveniences to full-scale legal battles. At the very least, communications managers and the consultants they rely upon can expect to devote a substantial amount of time defending their recommendations and refuting their vendors' objections.

The fallout from a serious challenge can spread far beyond the organization and damage the reputation of the communications manager and the consultant. Make no mistake; what is at issue is the manager's credibility. Successfully rebuffing a challenge can enhance the manager's credibility within the organization and establish his reputation as an effective leader.

Three-pronged defense

A manager's ability to fend off challenges hinges on three key factors: a solid request for proposal (RFP), a rigorous evaluation of the bids and an aggressive defense of one's recommendations. The best way to proceed when making recommendations is to do such a thorough job of preparation, research and evaluation that there is no room for a vendor challenge.

Managers who have retained a consultant may have an advantage in this regard, since much of this preparation is "standard con-

See Management page 34

Daubitz is president of ATI Telemanagement, a Boston-based telecommunications consulting firm.



ador challenges

put your career on the line.



JOHN KILROY

Management from page 32

sulting practice." But standard practice assumes a new urgency in the face of a serious challenge by a disgruntled vendor. And in a municipal organization, what is standard can quickly become nonstandard if a vendor tries to exert political pressure.

For example, municipal management in a small Northeastern city recently faced a vendor challenge. The city has just under 28,000 people and anticipates sustained population growth for a number of years — one developer alone is building 800 housing units. Municipal services are, as a result, expanding rapidly.

The municipal phone system is largely antiquated. A cord switch-

board was installed in the early 1960s to handle police and fire call boxes. Although nearly all of the boxes had been removed, the switchboard was still operational, costing the city \$4,500 per month. In addition, it was supervised seven days a week, year round. The communications manager hired a consultant to help recommend a new system.

The RFP was drawn up for a new system, and four vendors responded. After a detailed examination, the consultant recommended a specific private branch exchange system as well as a vendor. The city's communications manager presented his recommendations to the city council, which accepted both proposals. At the meeting, representatives of one vendor stood and verbally protested.

A few days later, the protest was presented in writing in a 10-page, 25-point letter to the mayor. The consultant and the communications manager were asked by the city to defend their recommendation.

The vendor's challenge fell into four broad areas: the consultant and the manager's accessibility, the evaluation criteria, technical issues and assessment of vendors. In three days, the consultant and manager had prepared a detailed, point-by-point response. The city was satisfied with the defense, and the vendor was not heard from again.

The successful outcome was due to several key factors: careful preparation of the RFPs, thorough evaluation of the bids and an aggressive defense of the manager's recommendations.

The defensible RFP

Municipalities and many non-profit organizations use the bidding process as a formal, legal structure, and the RFP is a crucial element of that structure. Creating a good RFP is a balancing act. The goal is to write an RFP that gives the manager maximum discretion and flexibility while providing the organization maximum legal protection. The RFP also has to be flexible enough to induce vendors to bid on it.

Definitions and parameters should be as specific and precise as possible. In the Northeastern municipality case, the consultant specified that the telephone system had to be a digital system, closing off the possibility that a vendor could present an analog system and then argue that he had met specifications.

Another good way to screen out possible objections is for the communications manager to attach a copy of a customized contract to the RFP. Vendors then will have a clear idea of the kind of contract they are expected to sign if they are awarded the bid.

Boilerplate contracts

Managers should also consider having the vendor sign a boilerplate contract clause stating that, even if it is the lowest bidder, the vendor will not sue the user organization or the consultant if it is not awarded the contract. Although such a provision is not necessarily

legally enforceable, it strengthens the manager's case.

The evaluation process in a bidding situation is a highly visible public process. The necessary contact with vendors to clarify and document bids, technical information and so on can be turned back on the manager and his consultant during a vendor challenge. The best defense is thoroughness and careful documentation.

In the example case, the vendor accused the communications manager and his consultant of not being accessible during the evaluation process. The consultant realized the underlying intent of the vendor's accusation — to cast doubt on the consultant's thoroughness and fairness, and thereby undermine the final recommendation.

The consultant responded in three ways. First, he directly challenged the validity of the vendor's charge, pointing out that maintaining objectivity as a consultant requires that vendors be kept at "arm's length."

Second, the consultant was able to provide proof of the thorough-

*"Creating a
good RFP is a
balancing
act."*

ness and fairness of his evaluation through phone records, written memoranda and other documentation. In addition, the city's purchasing agent had personally visited each of the vendor's sites as part of the evaluation. Finally, the consultant provided documentation of extensive contact with the vendor during the bid evaluation period.

Formulating the response

Despite a manager's best efforts, a vendor may challenge his organization's recommendations. When that happens, the best defense is a forceful and assertive one. The response should demonstrate the communications manager's and consultant's complete grasp of all the details and their resolve in refuting the accusations.

A written challenge should be completely reviewed. Not only must the specific objection be answered, but the response of the manager and the consultant should conform to a strategy. Just as the vendor has an underlying goal to win the bid, the user's aim is to maintain his credibility by meeting any public or legal requirement necessary to protect the integrity of the bidding process. The user and the consultant should work together to present their response to the vendor, and they should have the response reviewed by an attorney before proceeding.

Users shouldn't underestimate the lengths a vendor might go to in his challenge. In the example case, the pressure began even before the consultant made his recommenda-

tions: The vendor's president, a state senator, made phone calls to the mayor, the city manager and members of the city council. Within days of the verbal protest, the company followed with a written one and with more calls to city officials as well as to the consultant.

When reviewing written objections, the manager should keep his perspective; not all are of equal weight. A typical tactic is to embroil the user or consultant in arguments over minor points. These points are best handled briefly, and the user should not hesitate to categorize them as nitpicking.

When responding to technical objections, it is important to put them in perspective for anyone reading the responses. Do the objections reveal a lack of awareness of the consultant's methods or the specifics of the RFP? In our example, the challenging vendor claimed that off premises extension lines in one application were preferable to the use of terminal interface equipment lines, which were recommended by the consultant.

In their response, the consultant and communications manager pointed out that the vendor was second-guessing the system design without intimate knowledge of the city's system needs. In addition, they argued, the vendor had ample opportunity to raise this objection at two previous bidder conferences and during the four-week period between receiving the RFP and submitting its bid, yet had failed to do so.

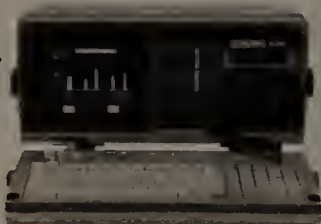
In some cases, a specific technical objection may require a detailed response. The communications manager should provide the facts needed to justify his recommendation and refute any distortions or inaccuracies in the vendor's objection. Also, the information should be presented as simply as possible. For example, the vendor argued that "modern users" who want to process critical data "generally require" redundant CPUs, a feature not found in the system recommended by the city's consultant.

In response, the consultant disagreed with the assessment, pointing out what the city's specific reliability needs were. He said that in more than 80 other cases where the recommended system was meeting needs similar to those of the city, redundant processors were extremely rare. Finally, the consultant used information supplied by the manufacturer of the vendor's phone system to show that the proposed redundancy could only be purchased at a much higher price.

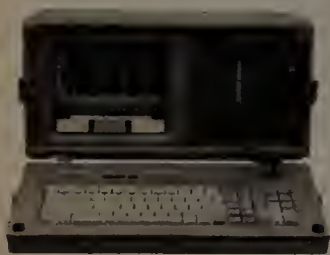
Telecommunications management in the public sector can be interesting and personally rewarding, but it must be approached in a professional way in order to turn back a serious vendor challenge. Mishandling such a challenge can cause embarrassment and bad publicity for the communications manager. It can also create a permanent, negative reference for the consultant.

Successfully overcoming a vendor's objections can go a long way toward establishing a manager's expertise and reputation. **Z**

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FEATURE FOCUS



Does research soothe the network beast?

Consulting firms are concocting user-oriented research services.

Continued from page 1

are vying for your budget money. But some of them, rather than ply you with state-of-the-art gadgetry, will try to sell you information that they say is the antidote to your confusion. These people are from market research firms that provide services for users.

The great number of market research services for vendors illustrates their immense popularity. By contrast, the number of user research services is puzzlingly few. The very term "market research" suggests forecasts of equipment sales and analyses of competitive marketing strategies — information per-

tinent to the vendor's line of business but of little relevance to the user.

Does the paltry number of available user services then reflect users' selling power or lack thereof? Currently, three companies, Gartner Group, Inc. of Stamford, Conn., International Data Corp. (IDC) of Framingham, Mass., and The Yankee Group of Boston split the user pie almost entirely among themselves. And while each boasts a fair number of clients and a profitable business with users, it appears that a high percentage of users are still braving areas on their own, without the help of these services.

Whatever the reasons for limited competition and limited subscription, Gartner Group, IDC and Yankee say they

have something worthwhile to offer users.

You be the judge.

Their services can be loosely split into deliverables and client services. Deliverables include all written information sent to clients on a consistent basis, while client services include call-in inquiry service, conferences, special consulting and the like.

International Data Corp.

IDC's Communications Technology Service (CTS) is headed by Kim Myhre, vice-president, and Jeff Kaplan, director. They've been with the company for six years and four years, respectively.

See **Research** page 39

RALPH MASELLO



SOMETHING BRILLIANT JUST HAPPENED TO DATA TRANSMISSION.

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The CP2000 digital termination is also flexible. You can mix voice, data and video in

any combination, then reconfigure the mix automatically whenever you want. That's an important part of controlling your own communications network. Which is what T1 is all about.

To keep that information clear and accurate over long distances, you can add echo canceling.

To make your network more efficient, you can add ADPCM voice compression and double the amount of voice traffic you can carry.

And to find out more about what our completely compatible new CP2000 digital termination can do, you can write Granger

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TECHNICAL REFERENCE

Accunet® T1.5
Service Description
and
Interface Specifications

Research from page 35

As is the case with Yankee and Gartner, IDC's communications user service this year had the same core as the vendor service. Information from and about vendors is used as a base to develop information for users. In 1987, as a result of a reorganization during the fourth quarter of 1986, IDC will begin to offer separate services designed according to the different needs of vendors and users.

Myhre says the program is aimed at MIS and telecommunications management personnel, to help them better their information systems strategies.

■ **Deliverables.** By year-end 1986, IDC user clients will have received some 20 reports covering data and telecommunications markets and service and maintenance issues. The 1987 deliverables will be slightly different, with a core of four major reports on communications and technology management, backed by smaller, semimonthly reports to be issued on subjects such as future technologies and key communications vendors, and planning guides for vertical markets and user applications.

Reports typically cover technology segmentation and definition; pricing analysis; distribution channels (where and for how much a product can be bought); each vendor's prospects for long-term survival; analysis of vendor product development strategies; standards development and vendor compliance; and service, maintenance and product applications. This last area is sometimes backed by extensive user surveys, sometimes by individual case studies.

From vendor research, IDC also can provide, where applicable to user requirements, market forecasts and market shares on 111 categories of communications equipment.

In addition to the four major reports and the semimonthly reports, clients receive "impact" briefs written about major company announcements or industry events requiring immediate analysis; either a monthly newsletter on communications called "Communications and Distributed Resources Report" or a monthly newsletter on Federal Communications Commission regulations called "Telecom Insider"; and the monthly "Communications Capsule," which is essentially a clipping service of technology-related articles appearing in *The Wall Street Journal*, *MIS Week* and *Electronic News*.

■ **Client services.** Upon subscription to the program, IDC provides a half-day "definition of interest"

session, during which the client's specific needs are brought to the attention of client service personnel.

Client inquiry is limited to three primary contacts per organization. IDC employs a full-time client service representative whose job is to see that client inquiries are responded to on an immediate basis and to find alternate sources if an analyst is out of the office. Clients have direct access to report authors on questions requiring in-depth knowledge. IDC also has a separate professional consulting staff that can be retained for help with special implementation issues.

IDC hosts two executive conferences yearly. In 1986, these were "The Strategic Impact of Emerging Technologies" and "Management Issues and Strategies." CTS also offers its own communications-specific conference. Each user organization is given three free tickets to all conferences.

Gartner Group

Gartner splits data communications and telecommunications into three services: Local-Area Communications (LAC), Strategies in Telecommunications Services (STS) and Enterprise Network Strategies (ENS).

The LAC program director, Vince Barrett, spent 10 years with AT&T Information Systems as network product marketing manager. STS Director Fritz Ringling has worked for more than 10 years as an independent consultant in the telecommunications industry. ENS Program Director Joaquin Gonzalez also has more than a decade of experience working for companies such as Satellite Business Systems, New Jersey Bell and AT&T. Gartner is, in fact, renowned because the bulk of its staff is composed of seasoned veterans in the communications industry.

The LAC service provides users with information on voice and data communications within the confines of the building or campus environment and information on gateways to wide-area networks. STS examines the entire telecommunications field, with a focus on international and regulatory issues. ENS covers companies and issues in wide-area networking, with an eye toward providing information to aid clients with the design and implementation of networks.

■ **Deliverables.** Each of the three Gartner services provides six annual strategic analysis reports that provide in-depth coverage on issues that vary from year to year according to their current importance. The reports generally

discuss company strategies, user needs, and product and technology analysis. The 1986 topics included the IBM Token-Ring Network, deregulation of the telecommunications industry and Integrated Services Digital Network.

Research notes, issued monthly in packages of six, provide overviews of various industry issues in two-page summary form. Past research notes have included Systems Network Architecture and X.25, data switching price trends, Bell Atlantic Corp.'s new wiring plan and the local-area network market by transmission medium over the next five years. Where Gartner deems it necessary, market shares and forecasts are provided.

■ **Client services.** Each service has its own staff consisting of three to six analysts, whom clients call directly. Like IDC, Gartner will provide the necessary materials to assist clients in choosing among vendors and products but will not make recommendations.

Each Gartner service sponsors one yearly conference in addition to regional user briefings. User organizations are allowed two conference attendees and two attendees to the regional user briefings. In addition, Gartner introduced a consulting service for strategic planning this fall.

Yankee Group

Yankee Group's Communications and Information Systems Planning Service consists of four modules: Information Systems, reviewing mainframe hardware and software issues; Distributed Systems, including local-area network analysis; Data Communications and Intercompany Networks; and Communications Systems and Services. Yankee says its program directors are typically former product managers.

■ **Deliverables.** Three to four analysts are assigned to each module and produce an average of seven in-depth reports annually. Report titles change each year, based on vendor and user interests. Yankee says the reports typically include an explanation of products and technologies, an analysis of how successful they have been, implementation issues and each vendor's prospects for long-term survival.

Users also receive four- to seven-page, biweekly newsletters designed to address current issues. The 1986 titles included "An Equal Access Update," "IBM's Departmental Strategy Update" and "DEC Extends Its Network to the Desktop."

Additionally, the company offers vertical market white papers

analyzing optimum use of technologies in the banking, insurance, health care and manufacturing industries. Like Gartner, market shares and forecasts are delivered when relevant.

■ **Client services.** Each client is assigned to an analyst for call-in, based upon the client's primary focus. Yankee will make recommendations from among products and vendors.

Yankee hosts a number of two-day seminars that focus on different industry issues. Clients receive two seminar registrations yearly for each program they buy.

Clients are also given a one day per year comprehensive session with one to three analysts to evaluate internal needs. This consulting session, which can be held at the user site, was developed to address individual user needs.

Yankee has a separate consulting service for in-depth analysis of design and implementation issues.

Users speak out

A sampling of users who subscribe to these services yielded primarily positive comments, although some said they didn't use the service as much as they should.

John Donovan, manager of telecommunications at Aetna Life and Casualty Co., waxed eloquent: "I think they're absolutely super. We use them on two levels; they have a decent track record of being accurate. We use the intelligence we get from them relative to setting directions or making some judgment about what sort of products or services we want to use and how much they are. We also use them if we're making a particular buying decision and want to find out, in the telephone area for instance, what's happening in Wisconsin, or how PacTel is pricing out Centrex. That's how we get some understanding of the negotiating positions we may have. We use them on a call-and-get-a-quick-answer basis as well as reading the material and find both helpful."

Nonetheless, market research for users isn't a universal panacea. At \$11,000 to \$18,000 per year, the service is designed to suit the masses but not the individual and his particular networking concerns. And although it appears that these three firms have taken pains to address the user audience, it's the vendors and their competitive concerns that generate most of the revenues for IDC, Yankee and Gartner. Given that caveat, users should consider these services a potential boon for their organizations but should take a close look at the merchandise before they buy. □

"Gartner Group will provide the necessary materials to assist clients in choosing among vendors and products."

"From vendor research, IDC also can provide market forecasts and market shares on 111 categories of equipment."

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- 1** My primary areas of activity. (Circle ONE only)
- I am involved in evaluating communications (data, voice and/or image) products and services:
1. for use *within my own company/organization*
 2. for *resale* to other companies/organizations
 3. Both
 4. Other (explain) _____

For communications, my primary responsibility is: (Circle ONE only)

1. Data Communications
2. Voice Communications
3. Both
4. Other (explain) _____

2 Circle only the ONE title classification which most applies to you.

Company Management

11. Chairman, Pres., Owner, Gen. Mgr., Partner, Director, CEO, VP, Dir. Head of Finance, Admin. Procurement

Communications Management

Data Communications

21. Management
VP, Dir., Mgr., Head, Chief: Data Communications, including Networks, Engineering, Design, R&D, Application Development
22. Supervisory/Staff:
Supervisor, Head: Networking, Design, Analysis, Engineering, R&D, Applications, Services

Telecommunications

31. Management
VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks, Engineering, Design, R&D, Application Development
32. Supervisory/Staff: Supervisor, Head: Networks, Design, Analysis, Engineering, R&D, Applications Services

Factory Communications

41. Management
42. Supervisory/Staff

MIS/Data Processing

51. Management
VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development, Operations, Office Automation
52. Supervisory/Staff: Supervisor, Head of Systems Design, Analysis Applications

Others

75. Consultant
80. Educator
85. Financial Analyst
90. Marketing/Sales
95. Other _____

- 3** Job Function
Which one of the following best describes your functional involvement with communications (data, voice, and /or video) products? (Circle ONE only)

Corporate

1. Business Management, Planning and/or Development

Communications System/Network

2. Management, Planning and/or Development
3. Implementation and/or Operation
4. Other _____

- 4** Which one of the following best describes the primary business activity of your organization at this location? (Circle ONE only)

Consultants

11. DP/Communications Consulting Services
12. Consulting Services (except DP/ Communications)

End Users

13. Manufacturer (other than computer/communications)
22. Finance/Banking/Insurance/Real Estate
23. Education
24. Medicine/Law
25. Wholesale/Retail Trade
26. Public Utility/Transportation
27. Mining/ Construction/ Petroleum Refining/ Agriculture/ Forestry
28. Business Services (excluding DP/Communications)
29. Government: Federal
30. Government: State/Local

Vendors

41. Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, International Records Carriers
42. Interconnect
43. Manufacturer Computer/Communications Equipment
44. Value Added Reseller (VAR), Systems House, Systems Integrator
45. Distributor
46. DP/Communications Services (excluding consulting)
95. Other _____

- 5** In which ways do you typically become involved in acquiring communication products (data, voice, and/or video) and services? (Circle ALL that apply)

1. Recommend/Specify
2. Identify/Evaluate Potential Vendors
3. Approve the Acquisition
4. None of the Above

- 6** Check ALL that apply in columns A and B.

- A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:
- B. These products and services are presently in use at this location:

A	B	Product/Services	A	B	Product/Services
Computers			Transmission/Network Services Equipment		
01.	<input type="checkbox"/>	Micros	18.	<input type="checkbox"/>	Microwave
02.	<input type="checkbox"/>	Minis	19.	<input type="checkbox"/>	Satellite Earth Stations
03.	<input type="checkbox"/>	Mainframes	20.	<input type="checkbox"/>	Local Area Networks
34.	<input type="checkbox"/>	Printers	21.	<input type="checkbox"/>	Wide Area Networks
Data Communications			22.	<input type="checkbox"/>	Packet Switching Equipment
04.	<input type="checkbox"/>	Communications Processors	23.	<input type="checkbox"/>	Fiber Optic Equipment
05.	<input type="checkbox"/>	Comm./Networks Software	36.	<input type="checkbox"/>	T1
06.	<input type="checkbox"/>	Digital Switching Equipment	Communications Services		
07.	<input type="checkbox"/>	Facsimile	24.	<input type="checkbox"/>	Packet Switching Services
08.	<input type="checkbox"/>	Modems	25.	<input type="checkbox"/>	Cellular Mobile Radio Services
09.	<input type="checkbox"/>	Multiplexers	26.	<input type="checkbox"/>	Electronic Mail
10.	<input type="checkbox"/>	Protocol Converters	27.	<input type="checkbox"/>	Enhanced Services
11.	<input type="checkbox"/>	Network Mgmt. & Control	28.	<input type="checkbox"/>	Centrex
12.	<input type="checkbox"/>	Test Equipment	29.	<input type="checkbox"/>	Long Haul Services
13.	<input type="checkbox"/>	3270 Controllers	30.	<input type="checkbox"/>	BOC Services
35.	<input type="checkbox"/>	Intelligent Terminals	31.	<input type="checkbox"/>	Independent Telco Services
Telecommunications			Other		
14.	<input type="checkbox"/>	PBXs	32.	<input type="checkbox"/>	Factory Communications
15.	<input type="checkbox"/>	Key Systems	33.	<input type="checkbox"/>	Online Data Bases
16.	<input type="checkbox"/>	Central Office Equipment			
17.	<input type="checkbox"/>	Integrated Voice/Data Terminals			

- 7** Estimated value of communications systems, equipment and services:

- A. which you helped specify, recommend or approve in last 12 months? (Check only ONE in column A.)
- B. which you plan to specify, recommend or approve in next 12 months? (Check only ONE in column B.)

(Check only ONE in column B)					
A	B	A	B		
1.	<input type="checkbox"/>	\$10 million and over	6.	<input type="checkbox"/>	\$100,000 - \$249,999
2.	<input type="checkbox"/>	\$5 million - \$9.9 million	7.	<input type="checkbox"/>	\$50,000 - \$99,999
3.	<input type="checkbox"/>	\$1 million - \$4.9 million	8.	<input type="checkbox"/>	Under \$50,000
4.	<input type="checkbox"/>	\$500,000 - \$999,999	9.	<input type="checkbox"/>	Don't Know
5.	<input type="checkbox"/>	\$250,000 - \$499,999			

- 8** Estimated gross annual revenues for your entire company/institution:

(Circle ONE only)

1. Over \$1 billion
2. \$500 million to \$1 billion
3. \$100 million to \$499.9 million
4. \$50 million to \$99.9 million
5. \$10 million to \$49.9 million
6. \$5 million to \$9.9 million
7. under \$5 million

- 9** Estimated number of total employees at this location:

(Circle ONE only)

1. Over 5,000
2. 1,000 - 4,999
3. 500 - 999
4. 250 - 499
5. 100 - 249
6. 50 - 99
7. 20 - 49
8. 1 - 19

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► INVESTIGATIVE REPORT

The consultant's conundrum

... is sometimes the client's problem.



GREG WENZEL

BY BYRON BELITSOS

Special to Network World

Second of a two-part series.

In the Nov. 24 issue of Network World, Part One of this article contrasted the consulting ethics set forth by the Society of Telecommunications Consultants (STC) with those espoused by consulting firms that also operate venture capital firms or offer investment advice. Part Two explores additional consulting conflicts and details defensive measures that can help users avoid hiring unduly biased consultants.

The temptation to mix vendors' and clients' interests has its basis in a consultant's everyday experience in the market. In fact, the *sine qua non* for success as a telecommunications consultant in today's environment is maintaining intimate relationships with both clients and vendors — especially with leading-edge vendors.

"A consultant is always tempted to offer a helping hand to a company bringing out an innovative product because you appreciate how it's going to solve a real-world problem," says Don Trafton, a principal in World Communications Group, a consulting firm in San Mateo, Calif. Trafton also teaches a course in telecommunications consulting at Golden Gate University in San Francisco.

"I've faced this myself," Trafton says. "It's a consultant's business to be intimate with client needs, so it's easy to spot a hot new product. When one comes along, you feel like recommending that vendor more often. And you know their stock is going to be worth owning. But you're a professional. You've got to brush off these feelings and put customer needs first."

The case of Network Equipment Technologies Co. (NET) of Redwood City, Calif., shows how consultants get close to vendors whose products break new ground. The start-up firm makes the IDNX switch (Integrated Digital Network Exchange), a highly innovative T-1 product. Two

See Consultants page 42

Belitsos is president of Lexicom Research, a San Francisco-based firm that offers writing and research services for the telecommunications industry. He is coauthor of the recently published book, Business Telematics: Corporate Networks for the Information Age, (Dow Jones-Irwin, Homewood, Ill.)

Consultants from page 41

well-known consultants who make a lot of money advising communications users have venture capital links to the firm.

Dixon Doll, owner and founder of DMW Group, Inc. is the consultant with the closest ties to NET. Aside from his large personal investment in the company, the venture capital firm in which he is a principal, Accel Telecom Partners, is also a NET investor.

Because NET has not yet been required to file with the Securities and Exchange Commission, the precise size of Doll's and Accel's current investments could not be confirmed. In addition, Doll sits on the board of directors of the company, and was retained for market consulting during the firm's early growth stages.

"The things I need to do in terms of investing have a high overlap with the things DMW does in terms of consulting, namely knowledge of user needs," explains Doll.

"But let me make one thing perfectly clear: The people involved with our consulting group know there is no pressure to favor one vendor over another. They'd take a walk in two seconds if there was. Also, DMW is a totally separate business from Accel. It is a completely autonomous operating entity with its own president and chief operating officer."

Howard Anderson, managing director of Boston-based Yankee Group, is also a managing partner in Battery Ventures, a venture capital group with a 2% stake in NET, worth \$850,000, according to Anderson. Anderson is quick to point out that the Yankee Group's share in Battery Ventures is small, less than 1%, and is invested for Yankee Group employees.

"If owning a small part of a 0.016% share of NET is a conflict of interest, then anyone who owns a few shares in AT&T or IBM is conflicted too," says Anderson.

"But such infinitesimal investments can hardly bias a consultant. The only serious ethical problem facing the industry is the old problem of 'installation consultants' in the voice communications world accepting bribes from vendors. This is an arena which really does require policing by an organization like the STC."

Another small NET investor, Soundview Partners, is a venture partnership funded by the Gartner Group, Inc. of Stamford, Conn., on behalf of selected key employees. Soundview's current capital is \$150,000, with \$10,000 of that invested in NET, says Gartner Group spokesman Grigsby Markham.

It should be mentioned that International Data Group (IDG), the parent company of CW Communications, Inc., publisher of *Network World*, is also owner of International Data Corp. (IDC), a market research and consulting firm serving the computer and telecommunications industries.

According to IDG Chairman of the Board and Chief Executive Officer Patrick J. McGovern, "IDG operates no venture capital firm or any company or organization giv-

ing investment advice. We have a deliberate policy of discouraging any analyst or market interpreter working for IDC, or reporters or editors writing for CW Communications, from committing their own funds or directly causing others to commit funds in the firms whose market performance we cover. If such a conflict arises, we want them to disclose and dispose of the relationship."

Although he has chosen not to spin off an investment firm from IDG, McGovern does have investments as a private individual. However, he says, he avoids investing in any companies that he will be asked to comment on, write about or speak about.

"My investments haven't been in

any individual companies," McGovern notes, "but in investment management companies and venture capital companies. The decisions as to which [individual] companies to invest in are made by the employees of those firms, not by me."

"Of course, I can find out who they invest in, but no one in my company has knowledge of that information, except myself. I don't want anyone else to feel positively or negatively toward these companies on account of the fact that an investment firm I'm involved in has any interest in these companies."

With regard to consulting firms that do become involved in venture capital activities or offer investment advice, McGovern observes, "It is my view that these companies

have put their analysts and consultants in a position that could lead to conflict of interest."

Both the Yankee Group's Anderson and the DMW Group's Doll deny that their financial ties to NET reduce their objectivity as consultants.

"It's true that a consultant needs to cultivate good relationships with vendors in order to fully understand their products," says John Wade Brown, president of Robert Wade Brown & Associates in Telecommunications, a consulting firm in Austin, Texas. "Intimate relationships with vendors are unavoidable. But investing substantially in vendors, even if disclosed, is going too far."

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helping consultants keep informed about new products and services, and to eliminate unethical ties between consultants and vendors, the STC started the Vendor's Advisory Council (VAC) in 1980. VAC members sign the same Code of Ethics as consultants. Close to 60 vendors are VAC members, and Jolene Witt, manager of consulting programs for Northern Telecom, Inc., is this year's VAC president.

"Both vendors and consultants have needed education in the ethics of consulting," states Susan Cuttner, Rolm's consultant liaison. "Only four or five years ago, the '10 percenters' — consultants accepting a 'finder's fee' — were pretty common. This has been almost completely snuffed out,

thanks largely to the policing activities of the STC.

"But today's problems are more subtle. For example, the STC is beginning to take a hard look at whether it's ethical for consultants to market their knowledge in their own software."

Doll sees no problem with consulting firms adopting the role of software vendor. His DMW Commercial Systems markets its own telemanagement software products and has recently merged with Commercial Software, Inc., a large New York firm that sells network management software. "The marketing of software by consultants is nothing new," according to Doll.

Consultants are in business, after all, to provide a professional

service; it's grossly unfair that already harassed communications managers should worry whether a consultant is harboring some self-serving conflict of interest.

But this is the conundrum of telecommunications consulting in the 1980s. Because of the unparalleled market opportunities of the postdivestiture era, the serpent of quick profits can easily compromise ethical judgment.

In addition, there is disagreement within the consulting industry itself as to whether financial ties between vendors and consultants actually harm users. Thus users are left to make their own decisions about the moral ambiguities involved.

Some consultants view these am-

biguities as largely irrelevant. "It's ridiculous to write stories about whether you think this is good or bad," Doll insists, referring especially to the problem of vendors such as IBM that now operate their own consulting groups (see discussion of this problem in part one, NW, Nov. 24). "Whether you think it's good or bad isn't going to change the world at all — that's just the way the world is. The consultants who are going to survive are the ones who understand this, who'll figure out a plan to participate in it, rather than sitting back and writing articles about violations of the code of ethics and such things."

For Doll it's a question of realism. "Small independent consultants who want to make a big noise about the objectivity issue better pull their heads out of the sand and understand the real world forces that are going to be in place soon."

Doll concludes this line of reasoning with a statement that flies in the face of the STC's attempt to create a universally respected and objective ethical code. "A consultant's reputation has to be his code of ethics," says Doll, "and our reputation stands on its own two feet. We've been in the business longer than 99% of the people who thought there was a need for an STC. I laud their efforts to keep disreputable and fringe players out of the business, but I see no need for a firm with an already established reputation, like DMW, to be involved in the STC."

Defensive measures for users

How can a communications manager find a more objective standard to rely on than a consultant's power and prestige?

The most efficient approach is to use the STC for consultant referrals. The society will send users its list of international consultants including their professional biographies and fields of expertise.

Because of the relative lack of publicity for the STC's efforts, many widely respected and experienced consultants are not members. One nonmember is George F. Colony, president of Forrester Research, Inc., of Cambridge, Mass. "The STC is not a bad thing, but I have no time to get involved," says Colony. "It offers me very few benefits, actually. There are a number of conflicts out there, but I'm skeptical as to whether a code of ethics is enforceable in an industry as freewheeling as this."

Colony did agree that a code of ethics is probably needed for policing consultants who are directly involved in implementation of new systems, where "the temptations for conflict of interest are greater."

Here are some questions several longtime STC members suggest communication managers may want to ask when screening consultants who are not society members.

Jane Laino, public relations spokeswoman for the STC and president of Corporate Communications Consultants in New York, offers the following advice:

- If the potential consultants are
See **Consultants** page 44

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1. Members shall maintain the highest standards of honesty and fair dealing toward their clients past and present, other members and the general public.

2. Members shall treat all information relating to the affairs of clients, obtained in the course of a consulting assignment, as confidential.

3. Members shall not knowingly place themselves in a position in which their interests are, or may be, in conflict with those of

any client.

4. Members are required to terminate any business or organization relationship that would require them to act in a manner inconsistent with the principles laid down in this code.

5. Members shall inform their clients of any business connections, affiliations or interests of which the client would have a reasonable expectation to be made aware.

6. In performing service for a

client, no member shall accept any fee, commission or other valuable consideration in connection with those services from anyone other than the client.

7. Prior to the commencement of services, members shall make the client fully aware of the fee structure and all associated costs.

8. Upon commencement of services, members shall take all reasonable steps to ensure that the client has a clear understanding of the scope and objectives of the work to be performed.

9. No member or vendor advisory council member shall intentionally injure the professional reputation of another member,

but members shall be required to inform the society's Professional Conduct Committee of any violation or apparent violation of this code or of the society's bylaws by any member.

10. No member or vendor advisory council member shall attempt to influence the professional judgment of any telecommunications consultant through the payment or offering of any fee, commission or valuable consideration.

The Society of Telecommunications Consultants, Suite 1410, One Rockefeller Plaza, New York, N.Y. 10020 (212) 582-3909.

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not STC members, ask why they are not. Find out whether they had once been members but were expelled.

■ If they are not STC members or are not aware of the organization, show them the STC Code of Ethics and ask them to incorporate it into the contract in some way.

■ Ask consultants to disclose any potential conflicts of interest that may even remotely affect their professional judgment.

Gordetsky: Check references

Gordon Gordetsky of G.R. Gordetsky Consultants in San Diego advises that communications managers:

■ Check the consultant's references closely.

■ Find out what vendors the consultant has recommended in the past. Is there any pattern in the recommendations? Are the same vendors often suggested? Are fringe vendors recommended too often?

■ Ask the consultants what they do to stay on top of the industry. What are their primary sources of information? What journals do they read, and what seminars do they attend?

Ungar counsels to stay involved

Finally, John Ungar, executive vice-president of operations for Comsul, Ltd. of San Francisco, suggests that communications managers:

■ Ask consultants to outline their consulting process in terms of hours normally spent on each step, and compare this with other consultants. Look for wild swings of differences. For example, if one consultancy says it may need 60 hours for product evaluation and another only 10, then it may be that the latter has already settled on the vendor it will recommend.

■ Stay involved at each step of the consulting process. Participate in the design of the request for proposal and vendor selection, and ask to see all correspondence carried out by the consultant throughout the project.

■ And finally, assert your right to objective, professional consulting services. Ask your consultant to sign a waiver or disclaimer indicating no current or potential conflicts of interest. □

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GM from page 2

EDS in 1985 and 1986. McFarland claimed hostility between GM staffers and EDS workers began on day one.

"There was tremendous animosity between GM and EDS since GM acquired EDS," he related. "While I was with GM, EDS employees always had a very arrogant attitude. They thought they could do no wrong, and they thought they were all-knowing."

Over the past few months, H. Ross Perot, EDS's senior officer and vice-chairman of GM, has made widely publicized, disparaging comments regarding what he perceives as mismanagement at GM.

McFarland questioned the need to air GM's laundry in public. "To

what benefit is it for Perot to run around and talk about GM's problems? All [Perot] is doing is demoralizing the troops," he asserted.

But despite strained relations, many communications industry watchers said they don't know how GM could do without EDS. An EDS source claimed GM provides EDS with \$375 million to \$750 million annually for communications-related expenses and investments.

Steven Page, president of the Dallas-based Page, Wheatcroft and Co., a management consulting firm, said even if GM were to sell EDS, GM would remain EDS' largest account. "The two are so intertwined, I can't see GM selling EDS."

EDS has already begun construction of a 3-tier internal communica-

tions network for the automaker that was to feature nine central office switches, 40 to 50 large private branch exchanges and 400 to 500 smaller switches. An EDS source confessed in June that the network was only 35% operational.

The beleaguered automaker announced the closing of nine assembly plants and a pair of additional facilities last month, an action that will leave some 29,000 autoworkers unemployed. GM's Saturn plant project — the Spring Hill, Tenn., manufacturing plant that was to act as a chariot to transport GM into the 21st century of manufacturing — has been scaled back.

GM about the capabilities of the Saturn production facility.

To worsen matters, two of GM's most advanced manufacturing plants are several months behind the automaker's original operation schedule. At last check, plant floor communications networks in the automaker's Saginaw steering gear plant and its three truck and bus factories are not yet operating in production mode.

AT&T has already been lauded by analysts for its purported willingness to acquire either part, or all, of EDS.

Janet Lipstein, a financial analyst with Drexel Burnham Lambert, Inc. in New York, said of AT&T's attempt to acquire EDS: "We have long felt the combination of EDS and AT&T is a far more logical one than the GM-EDS combination." □

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APPC/PC from page 31

face coprocessor, A Realtime Interface Co-Processor (ARTIC). This 80186-based coprocessor plugs directly into the IBM Personal Computer bus I/O channel, communicates externally at up to 64K bit/sec and is supported by IBM with a developer's kit and C Language programming tools. Users can expect other manufacturers to introduce similar communications coprocessors in the future.

The use of the ARTIC card could support APPC/PC on a plug-in card that allows IBM Personal Computers, Personal Computer XT's and Personal Computer AT's to connect to SNA networks. The ARTIC card would enable the support of SNA communications applications without monopolizing the processing power of the personal computer. Communications vendors could interconnect their communications systems to SNA networks via the same card, lengthening the life of their designs while allowing their users to interconnect to an SNA communications application.

With the advent of the ARTIC card, users desiring an SNA environment will be able to connect their existing inventory of IBM Personal Computers, XT's and AT's into SNA networks, rather than having to purchase the new 80386-based machines. □

Voice from page 30

problem for users, who could get stuck with antiquated technology.

Most of the equipment available two years ago focused on a single application and was hard-wired for that application. Today users can add two or more applications to a basic machine simply by adding software.

Several companies offer one machine that can do voice messaging, transactions and telemarketing, for example.

Interactive voice is not just a transient technology, a stand-in until the still-anticipated videotex services arrive.

Rather, interactive voice services of all types will revolutionize the use of the telephone for accessing information and will supplant most, if not all, of the low-end applications that videotex was supposed to provide. □

► FEDERAL NETWORKING

USDA national network rides Telenet backbone

BY KARYL SCOTT

Washington, D.C. Correspondent

WASHINGTON, D.C. — The U.S. Department of Agriculture (USDA) has amassed an arsenal of communications technologies to link 10,000 sites and 30,000 users across the country in one of the federal government's largest wide-area networks.

The USDA's Depnet combines dedicated private lines, very small aperture terminals, transportable earth stations, and fiber-optic and microwave transmission facilities, all of which feed into Telenet Communications Corp.'s public data network. That Telenet backbone network transmits some 190 million packets of data per month between USDA facilities.

The USDA recently held its own version of a communications fair at its headquarters here to give the public its first look at Depnet.

The USDA maintains 15,000 field offices in the U.S., Puerto Rico, the Virgin Islands and Guam. The geographically dispersed nature of the USDA's operations was the driving force behind the creation of Depnet, which currently links users at 10,000 of those sites with computing centers here and in Fort Collins, Colo., New Orleans and Kansas City, Mo. The remaining 5,000 field offices will eventually be tied into Depnet.

Depnet reaches into every county in the U.S. through the National Forest Service, Agricultural Stabilization and Conservation Service, Farmers Home Loan Board, Soil Conservation Service and other USDA agencies. Applications on

the network include electronic mail, data base access, document transfer and batch processing.

"Our data communications requirements began almost as soon as we acquired data processing facilities," said Glen Haney, director of the USDA's Office of Information. "Initially, in the early 1970s, we used the local public network for data transmission, but it soon became saturated, and our access to those facilities was limited."

After conducting an analysis of various departments' anticipated communications needs in the mid-1970s, the USDA decided to build its own packet network. In the process of writing a request for proposal and collecting information, the USDA realized it would be wiser to contract with a value-added network vendor who already had a backbone network in place.

In 1983, the USDA awarded a \$160 million contract to Telenet to provide a backbone facility over which all long-haul data traffic is routed. The USDA pays an established monthly fee for service, support, network design upgrades and network management. Telenet also provides, through other vendors and carriers, all the other communications equipment used in Depnet.

"If a packet-switched network wasn't available to us, we would have had to invent one ourselves," Haney said.

Depnet represents the USDA's concerted effort to standardize its communications, regardless of the application involved. "We have one contract, with one vendor for a single data communications network,"

Haney explained. "We don't allow our agencies to acquire their own individual networks. Everyone must use Depnet. This allows us economies of scale."

The USDA has also standardized the use of X.25 as the basic communications protocol. "When we started out we had every type of protocol you can imagine," said Sid Haggard, Depnet project manager. "We're in the process of incorporating X.25 in all our facilities, although there are instances where we have to use dial-up leased lines, which are provided for us by Telenet. All USDA requests for proposals for communications products require X.25 compatibility."

The USDA also uses Systems Network Architecture for communications between IBM computing centers.

The Forest Service recently began using 250 Equatorial Communications Corp. VSATs to communicate from remote, often mountainous regions with the host center in Fort Collins. The Forest Service also uses microwave and private radio facilities to communicate.

"The Forest Service needs to be on-line all the time," Haggard said. "The people need dedicated access but the traffic is usually low volume. We were paying for dedicated private lines but we thought VSATs would help us reduce our costs." Generally, the USDA will employ VSATs for users transmitting under 100 kilopackets per month.

The Farmers Home Loan Board recently began using X.25 dial service to access data bases at the Kansas City computer center. X.25 dial allows end users to communicate synchronously over the Telenet backbone by dialing into the network with a modem. Prior to this dial-in feature, users had little choice but to use leased line facilities, according to Phil Taylor, Telenet project manager for Depnet. □

Nynex from page 2

User Originating Access Service, Nynex put forward a tapered billing scheme that would offer discounts to large users of switched service. The plan also called for Nynex to add a surcharge of about \$5 per termination per month for each voice-grade private line.

Nynex asked for permission to shift traffic-sensitive costs associated with providing special access for private lines from the interexchange carriers to the end user. The FCC reserved judgment on the request since that item is the subject of a Federal-State Joint Board proceeding. The FCC could review this item again upon receiving the Joint Board's recommendation.

To help the local exchange carriers in future requests, the FCC handed down a new series of guidelines to be used in filings.

These guidelines were added to the FCC's April 3, 1986 Guidelines Order establishing limited circumstances in which the FCC would consider local exchange carrier flexibility in recovering access-related costs.

"There is tremendous competition to provide service to large corporate customers, who account for most of the revenue of the common carriers," Halprin said.

"We realize Nynex's concern that it doesn't have an opportunity to compete with AT&T and other carriers to serve this market, but we have to remember that Nynex is still a very dominant carrier. To give the local exchange carriers control over this piece of the network could have serious anticompetitive consequences," Halprin noted.

Nynex had argued that its proposed access charge plan would help prevent the threat of bypass. Detractors said the plan would lower the cost of long-distance service for Nynex's largest users at the expense of smaller customers.

In a prepared statement issued after the FCC had rendered its decision, Don B. Reed, Nynex vice-president for federal relations, said the plan would have "maintained reasonable rates for residential and small business customers while providing incentive to large business customers to remain on the networks." □

ISDN from page 4

has to do business," Super said.

Like Southwestern Bell, Nynex will initially conduct laboratory testing. The company is focusing on the primary access standard and the task of interfacing to IBM's Systems Network Architecture. Trials to test ISDN to SNA connections are scheduled for third quarter 1987.

Nynex is also aiming to build what it calls an intelligent network architecture, which involves creating an all-digital network. By the late 1990s, the company hopes that upwards of 80% of its network will be digital, up from 20% today. A key goal for Nynex is the ability to offer customers a private virtual network service. A trial for such a service is slated for the fourth quarter of 1987. □

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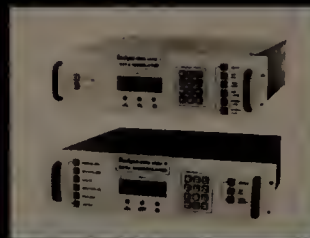
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The report will, we hope, foster a greater understanding of this emerging technology among executives, politicians, and end users.

Since our goal is to develop a paper that accurately reflects the vitality of networking and the views of the people who are involved with it everyday, your input as a communications user is essential. Of course, if we quote you in our paper, we will credit both you and your company.

We would greatly appreciate any views or insights you might want to share with us. To participate simply answer any or all of the following questions; fill in your name, title, company, and address; and send to Bob Forest, our consultant for this project, at Information Age, Inc., 49 Richmondville Avenue, Westport, CT 06880.

MAIL TO: Bob Forest, Information Age, Inc., 49 Richmondville Avenue, Westport, CT 06880.

1. What is your definition of networking?

2. In your opinion, how will networking revolutionize the way we conduct our business?

3. What is the primary hurdle that networking must surmount in order to achieve its full potential?

4. What solutions do you see for the problem of standardization in networking?

5. What kinds of new applications must be developed to make networking more universal?

6. Should technology be sacrificed to keep networks user-friendly?

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NETWORK WORLD

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EPSCS from page 1

network improvements narrowed the ranks of EPSCS users seeking a shared network alternative. As a result, a final version of the RFP was not released. Of the major carriers receiving the initial RFP, only US Sprint Communications Co. responded.

The RFP called for a digital backbone network that would initially handle digitized voice traffic and, at a later date, high-speed data transmissions. The RFP also sought a 3- to 5-year fixed rate for the network.

AT&T's EPSCS service was designed to provide savings for large users that combined their voice traffic and routed it through a network equipped with dedicated, shared AT&T 1ESS central office switches.

EPSCS currently supports the voice and, to a lesser extent, data communications traffic of more than a dozen large users, including North American Philips, Eastman Kodak Co., Bethlehem Steel Corp. and Xerox Corp.

These users claim the skyrocketing cost of linking their sites to network nodes has forced them to seek network alternatives ("EPSCS users balk," *NW*, Aug. 11). The users say acquiring access lines to EPSCS nodes represents between 35% and 40% of the sum they pay for the service.

Smoker, who coauthored the initial RFP, claimed EPSCS is not part of AT&T's future long-distance service strategy. He claimed AT&T is trying to lure EPSCS users to its Software-Defined Network (SDN) service. "There is no doubt in my mind that AT&T's long-term goal is to do away with EPSCS and leave users with no alternative except to migrate [to SDN]," he maintained.

Despite repeated requests for comment, AT&T officials were not available to speak on the EPSCS issue. A spokesman would only say, "To surmise that AT&T is trying to move EPSCS users off the network and onto SDN would be a faulty conclusion."

At least one former EPSCS user, Transamerica Information Services, has already become an SDN user.

At a September meeting of the

EPSCS users group in Orlando, Fla., Smoker claimed AT&T officials talked once again of adding 5ESSs to the EPSCS network. The all-digital 5ESSs are viewed by some EPSCS users as the switches that would anchor the digital network these users covet.

The telecommunications manager said AT&T did not respond to the preliminary RFP. "They did, however, explain at the last users group meeting that if they had to stop and respond to the RFP, it would cut into resources the company could use to deploy the 5ESS switches." AT&T's talk of EPSCS network improvements assuaged many users' fears that EPSCS was not a part of AT&T's future, he said.

"AT&T was obviously trying to head off the RFP effort by telling EPSCS users they didn't need to pursue the RFP plan because AT&T was going to take care of them anyway," Smoker claimed.

"This talk took much of the steam from the effort to put the RFP out on the street, even though this was the second or third time users had heard this story."

The future of the user-backed RFP effort is uncertain. Smoker claimed several EPSCS users have already begun negotiations with MCI Communications Corp. and US Sprint to explore networking alternatives to EPSCS. He added the finalized RFP may be released at a later date.

"We at North American Philips are convinced that the RFP project is a great idea," he said.

Smoker is not alone in his concern for the future of EPSCS. Joaquin Gonzalez, director of new communications services for the Stamford, Conn.-based Gartner Group, Inc., a market research and consulting firm, agreed that AT&T wants to migrate all current EPSCS users to the carrier's SDN.

"EPSCS is a deliberate dinosaur. AT&T never intended for users to stay on the EPSCS network very long," he claimed.

The number of EPSCS network access nodes, long a point of contention between EPSCS users and AT&T, has not yet been resolved. At present, EPSCS users can only access the network from some 17 system nodes. □

TCP/IP from page 1

But TCP/IP faces an uncertain future. TCP/IP and attendant application software is functionally limited compared with standards developed by the International Standards Organization (ISO). And the Defense Department, the largest proponent of the protocol, announced recently it will migrate from TCP/IP to the ISO standards over the coming years.

With the writing on the wall for TCP/IP, debate now revolves around whether users building networks to a single transport protocol should employ TCP/IP or new international standards — standards that, while fully defined, are not yet widely implemented.

TCP/IP proponents say the protocol is widely supported and well tested, qualities the ISO protocols will lack for a few more years. Proponents of ISO standards say products that support ISO protocols are available now from multiple sources and that their implementation will obviate the inevitable need to migrate to standards later.

TCP/IP corresponds with Layers 3 and 4 — the network and transport layers, respectively — of the 7-layer ISO Open Systems Interconnect (OSI) network model. While functionally similar, the ISO protocols are designed to work in concert with upper layer ISO software that offers more functionality than TCP/IP applications.

ISO's File Transfer Access and Management (FTAM), for example, functionally dominates TCP/IP's File Transfer Protocol (FTP), according to Dan Lynch, president of Advanced Computing Environments, a firm that provides technical consulting to users and vendors. FTP requires entire files to be transmitted, whereas, using FTAM, portions of files can be transferred.

But you have to write applications to invoke FTAM, Lynch said.

Time is the sticky wicket. "OSI is a well-thought-out approach to distributed computing, and no doubt the future," Lynch said. "But it isn't here yet and will take a long time to build."

Others disagree. Implementations of Layer 3 and 4 ISO protocols are already available from IBM, Digital Equipment Corp., Retix,

Touch Communications, Inc. and Omnicom, Inc., according to Hal Foltz, president of Omnicom, a Vienna Va.-based firm that advises companies on ISO implementation.

Perhaps more importantly, IBM and others now offer software that conforms to upper layers of the OSI model. IBM recently announced the General Teleprocessing Monitor for Open Systems Interconnection. When used with IBM's Open Systems Network Support and Open Systems Transport and Session Support program products, the software provides an OSI way in and out of IBM's popular CICS teleprocessing monitor, according to Rudolf Strobl, a senior management consultant with Arthur D. Little, Inc., a Cambridge, Mass.-based consulting firm.

"IBM has implemented portions of OSI on a large number of strategic computers, including the Series/1, System/36, System/38, Personal Computer and its mainframes," Strobl said.

According to Bjorn Ahlen, senior consultant responsible for project management with Retix, a vendor of OSI-compatible software, "Everybody thought they would be using TCP/IP until OSI was here, and then OSI turned up much faster than anyone anticipated."

Questions remain about the functionality of the new arrival. Lynch, of Advanced Computing Environments, said ISO's Layer 3 internet protocol, for example, is immature. Trivial but time-consuming problems, such as how large routing tables should be in gateways, will abound, Lynch contends. "It takes years to get internetworking to work right," he said.

"TCP/IP is a viable, robust and implementable networking technology for heterogeneous networks," said Terence Bentley, director of communications research at the Yankee Group, Inc., a Boston research and consulting firm. "TCP/IP minimizes risk," Bentley said. "Users can evolve to an industry standard without obsoleting their expensive cabling systems and local network interfaces."

For users sizing up the situation now, Strobl lends this advice. "If you don't have TCP/IP, it wouldn't be wise to put it in now." □

CPE from page 1

tions services as a single offering. In addition, the Modified Final Judgment still prohibits the BOCs from manufacturing customer premises equipment.

In announcing its decision, the FCC said the cost of maintaining separate subsidiaries for the provision of customer premises equipment was too high for both the BOCs and their customers and was not in the public's best interest. The FCC said BOCs could save as much as \$25 million in duplicated costs.

"We found significant costs in maintaining duplicate personnel and facilities, which were passed on to customers as a result of the separate subsidiary requirement," said Melanie Haratunian of the FCC Common Carrier Bureau.

The FCC's new safeguards are designed to allow the Bell companies to better respond to user demands for integrated systems and services. As Bell Atlantic Corp. Vice-President of Federal Regulatory Affairs David E. Berry said, "The order allows us to coordinate our network and customer premises equipment offerings as the customer's needs dictate."

The FCC issued five nonstructural requirements that the BOCs must follow. In addition to the accounting rules, the BOCs must provide nondiscriminatory access to network services, permit independent customer premises equipment vendors to act as sales agents for BOC network services, disclose technical network information for new or changed network services that could affect customer premises

equipment interconnection and make proprietary customer network information available to competing customer premises equipment vendors.

The FCC determined in the Computer III order in May that the same accounting rules will apply to the provision of enhanced services such as packet switching and protocol conversion.

The North American Telecommunications Association (NATA), which represents customer premises equipment vendors, did not oppose the FCC's decision. NATA President Edwin B. Spievack said he was especially pleased with the FCC's requirement that BOCs allow independents to act as service sales agents. "The sales agency program is an important nonstructural safeguard for industry and ratepay-

ers," he said.

"The separate subsidiary order was never our major concern," said Charlotte LeGates of the Computer Business Equipment Manufacturers Association. "We are more concerned with how these safeguards will be monitored and upheld. We are not opposed to the BOCs offering CPE, but we realize the danger of anticompetitive behavior is great. We are for as much deregulation as the industry can manage as long as regulators ensure that the BOCs are not given an unfair advantage."

AT&T spokesman Herb Linnen said his company would not comment on the order, although in comments filed with the FCC on this issue, AT&T supported the removal of structural separation safeguards on the BOCs. □

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Dec. 4-5, Arlington, Va. — Token-Ring Network and Application Program Interfaces Seminar. Contact: Communications Solutions, Inc., 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

Dec. 7-9, Washington, D.C. — MVS Architecture. Contact: ACTS Corp., P.O. Box 180, Kingsland, Texas 78639.

Dec. 8, Los Angeles — Distributed Database: How to Integrate Data in a Multi-Vendor Environment. Also, Feb. 23, Washington, D.C. Contact: Digital Consulting Associates, Inc., 6 Windsor St., Andover, Mass. 01810.

Dec. 8-9, New York — The Plain-English Seminar on Telecom Management Strategies: How to Find the Best Solution for Your Company. Contact: Telecommunications Alert, Seminar Registration Department, One Park Ave., New York, N.Y. 10016.

Dec. 8-9, Boston — Understanding the X.25 Protocol and Packet Switching Networks. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015.

Dec. 8-10, Stamford, Conn. — Private Networks: Future Directions. Contact: Chris Sherman, International Resource Development, Inc., 6 Prowitt St., Norwalk, Conn. 06855.

Dec. 8-10, Chicago — Fundamentals of Telecommunications. Contact: ABC TeleTraining, Inc., P.O. Box 537, Geneva, Ill. 60134.

Dec. 8-10, New York — Data Communications Systems and Networks. Also, Jan. 14-16, Houston; Jan. 21-23, Chicago; Jan. 26-28, Washington, D.C. Contact: Data Communications Institute, 55 Main St., Madison, N.J. 07940.

Dec. 8-11, Washington, D.C. — National Data Communications Symposium on Local Area Networks and Micro-Mainframe Links. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

Dec. 9-10, Washington, D.C. — Central Office Switching: New Technologies and Network Applications. Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

Dec. 9-10, Chicago — Digital

Data Networking. Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

Dec. 9-11, Los Angeles — Fiber Optic Splicing. Contact: ABC Tele-Training, Inc., P.O. Box 537, Geneva, Ill. 60134.

Dec. 11-12, Boston — Advanced Communication Architectures Seminar. Contact: Communications Solutions, Inc., 992 S. Saratoga-Sunnyvale Road, San Jose, Calif. 95129.

Dec. 11-12, New York — Telecommunications Management: Managing from Expense to Profit. Contact: McGraw-Hill Information Systems Co., 1221 Avenue of the Americas, New York, N.Y. 10020.

Dec. 11-12, Chicago — T1 Networking. Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

Dec. 15-16, Washington, D.C. — Understanding the X.25 Protocol. Also, Jan. 12-13, Princeton, N.J.; Jan. 14-15, New York; Jan. 22-23, Columbus, Ohio. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015.

Dec. 16, Washington, D.C. — How to Bid on \$2 Billion in Telecommunications Projects. Contact: U.S. Telecommunications Suppliers Association, Suite 1618, 333 N. Michigan Ave., Chicago, Ill. 60601.

Dec. 17-19, New York — Dexpo East '86. Contact: Expoconsul International, Inc., 3 Independence Way, Princeton, N.J. 08540.

Dec. 18-19, Denver — X.25: Evaluating and Selecting Offerings and Options. Also, Jan. 15-16, Minneapolis; Jan. 29-30, Boston; Feb. 5-6, Atlanta; Feb. 19-20, Washington, D.C. Contact: Center for Advanced Professional Education, 1820 E. Garry St., Suite 110, Santa Ana, Calif. 92705.

Jan. 6-8, Washington, D.C. — An Introduction to Data Communications. Also, Jan. 12-14, Albuquerque, N.M.; Jan. 14-16, Hartford, Conn.; Jan. 21-23, Indianapolis. Contact: American Institute, 55 Main St., Madison, N.J. 07940.

Jan. 14-16, Washington, D.C. — Protocols for Open System Interconnection. Contact: The George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

Jan. 18-21, San Antonio, Texas — Association of University Telecommunications Administrators' Winter Seminar. Contact: Association of College and University Telecommunications Administrators, 211 Nebraska Hall, Lincoln, Neb. 66855.

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► PRODUCT REVIEW

Muxes save cable and more

For years, IBM 3270 users needed a single coaxial cable to connect each terminal device to the terminal control unit, or cluster controller. Although that arrangement is still widely used, many network managers are now investigating terminal multiplexers as a means to furnish the same service with fewer cables. What they are finding is that terminal multiplexers save a lot more than just the cost of cable.

The IBM 3270 is a clustered terminal system consisting of a cluster controller and up to 32 terminals. The terminal multiplexer is located between the terminals and the cluster controller.

Terminals are attached to the terminal multiplexer via RG 62/AU coaxial cables. The multiplexer scans each terminal and uses only one 2.358M bit/sec link — as opposed to up to 32 lines — to transport data between the terminal devices and their cluster controller.

At the controller site, another terminal multiplexer routes individual channel messages to the appropriate port on the 3270 controller. The terminal multiplexer, therefore, reduces the number of cables needed to service many terminal devices to only one.

However, saving a few dollars on coaxial cable is not the primary reason for using a terminal multiplexer. After all, with the typical cost of the RG 62/AU coaxial cable that IBM uses with the 3270 at 15 cents per foot, a user would have to replace several long-distance cables to justify the cost of two terminal multiplexers (see chart).

What terminal multiplexers do save is space in the cable conduits and the labor needed to pull them to their destinations. Coaxial cable is fat, heavy and takes a considerable amount of time and trouble to pull. In large cities, unionized labor easily runs between \$25 and \$50 per foot just to pull cable. Terminal multiplexers look attractive for new applications.

Recently, fiber-optic cable has attracted lots of interest as an alternative to coax. Fiber-optic cable is thinner and lighter than coax — some is the size of lamp cord — and is unaffected by electromagnetic and radio-frequency interferences that cause errors in other media.

Fiber-optic cable has less signal loss than coax, and a bit-error rate of one per billion or better. Fiber-optic cable also allows greater distances without repeaters between the terminal and its cluster controller because of its lower loss rate.

However, fiber-optic cable can be expensive. The basic dual-fiber multimode 50/125 micron cable, the type recommended for 3270 applications, costs approximately 75 cents per foot, plus the cost of the connector. A fiber-optic connector lists for about \$25 uninstalled or about \$40 installed. Because terminal multiplexer vendors use their

own connectors, they may be able to offer a better deal on them.

Another drawback of fiber-optic cable is that it experiences signal loss each time it is tapped. The loss level depends on the quality of the connector, but between 1dB and 2dB is not uncommon. Thus multidrop terminal applications are difficult to implement with fiber-optic cable. All of the multiplexer vendors listed support multidrop.

Fiber-optic cables are well-suited for hostile environments where electromagnetic and radio-frequency interference exists. They also provide a high level of security because it is almost impossible to tap into them without being detected. Even with its high price, fiber-optic cable is well worth it for the right applications.

The fiber-optic terminal multiplexer also permits many terminals

data directly without multiplexing. The Artel Communications Corp. Slimline 3270 uses time-division multiplexing to assemble a message block containing inputs from all attached terminals. The scan technique is the most efficient because there are no delays when assembling a message block and no space is wasted in the composite.

All these products have two composite link ports for connecting an individual link to separate 3270 controllers, except for the Fibercom FM-32. Each link has its own associated terminals. The second port can also be used as an alternate route if the primary one fails.

Switchover to the secondary route is automatic with the Fibronics box; the Artel unit requires the operator to switch the lines manually.

The dual-composite link facility

creased distance is available as an option. Stand-alone terminal multiplexers are also available.

The distance limitations between the terminal and its cluster controller are also influenced by the polling time-out restrictions of the cluster controller. Some IBM controllers have a longer time-out than others, but IBM offers increased time-outs on a request-for-quote basis.

Astrocom Corp. of St. Paul, Minn., is also a major manufacturer of coaxial and fiber-optic terminal multiplexers but would not provide prices and, therefore, was not included.

Are terminal multiplexers worth it? Their value depends on the application. For a few cables running short distances between the terminal and its cluster controller, where space is available in the cable conduits and cable-pulling costs are reasonable, terminal multiplexers are not worth it. With RG 62/AU cable selling for about 15 cents per foot, eight cables running 500 feet cost only \$600 plus connector and cable-installation charges.

An eight-port multiplexer such as the Artel Slimline 3270 costs \$750 per end, plus the cost of a single cable and its installation. Although it appears individual cable runs win hands down, consider the cost of pulling cables. That is the pivotal factor because cable-pulling costs vary so widely. Of course, the cost of two multiplexers must be added in.

The decision to go with fiber optics is based on the same factors. Although fiber-optic cable and its connectors are more expensive, its physical properties make installation a lot less expensive.

Telephone lines can be used to connect terminals to the cluster controller. That method is becoming popular but requires a balanced/unbalanced device at the terminal and controller ends of both lines to convert the unbalanced coaxial interface into a balanced electrical signal that can be carried on a wire pair at 2.358M bit/sec.

Transmission distance, however, is limited by the gauge of wire used; approximately 1,000 feet seems to be tops. Balanced/unbalanced device prices vary, but the average price is about \$35 each.

IBM's new 3270 coax-to-twisted-pair adapter also uses a balanced/unbalanced device and has a transmission range of 900 feet. The adapter costs \$100 per end.

IBM offers a terminal multiplexer called the Model 3299. That unit, which accommodates eight terminals, works with coaxial or twisted-pair wiring but doesn't support fiber-optic cable. The 3299 allows a terminal-to-controller distance of 9,840 feet using coax and up to 1,800 feet using twisted-pair. The other vendors listed indicate similar support. □

Terminal multiplexers: transmission distances and costs

	Vendor/Product		
	Artel Communications Corp. Slimline 3270	Fibronics International, Inc. FM-1674/78	FiberCom, Inc. FMX-32
Maximum transmission distance (feet)			
Coaxial	5,000	5,000	5,000
Fiber	6,000 or 10,000	12,000	8,300 or 15,000
Cost (\$)/end			
Coaxial			
Eight ports	750	1,400	2,575
16 ports	1,350	1,720	3,005
24 ports	Not offered	2,080	3,435
32 ports	1,875	2,440	3,860
Fiber			
Eight ports	900	2,305	2,575
16 ports	1,500	2,720	3,005
24 ports	Not offered	3,135	3,435
32 ports	2,250	3,550	3,860

SOURCE: TMS CORP., DEVON, PA.

to share one high-speed composite link. However, the fiber-optic unit does not generate data pulses; rather, it shapes digital pulses from the terminal and converts them into light pulses, or photons, via an LED. The light signals travel as a series of pulses to the destination where they are converted back to their binary state.

Because of the differences in the technologies, fiber-optic terminal multiplexers can only be used for fiber-optic cable.

The fiber-optic multiplexer works in pairs, just like its coaxial brother. For 3270 applications, the terminals connect to the multiplexer via RG 62/AU coaxial cable. The link between the multiplexers is a fiber-optic cable capable of transmitting 2.358M bit/sec. At the 3270 controller end, the transmitted data is sent to the controller ports via RG 62/AU cable.

The Fibronics International, Inc. FM 1674/78 and Fibercom, Inc. FMX-32 essentially scan each terminal and transmit each block of

is an attractive feature because it can save the customer the expense of purchasing a second set of multiplexers to service many 3270 controllers at the same location.

Each vendor offers a multidrop facility that allows several terminals to share a single line. Also, Fibercom offers an Optical Star Coupler that takes the outputs from four FMX-32s and combines them over one fiber-optic cable composite link to the cluster controller.

Each of the multiplexers operates with coaxial or fiber-optic cables and transmits data at a rate of 2.358M bit/sec. The maximum distance, however, varies with the transport medium. Links that use coaxial cable allow end-to-end controller-to-terminal distances that are much shorter than those supported by fiber-optic cables. The fiber-optic cable used to calculate the distances had a 50-micron diameter, according to the vendors.

Both the FiberCom FMX-32 and Artel Slimline 3270 show two transmission distances. The in-



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